

OXWELD

C-66-1400 CUTTING TORCHES



These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for oxy-fuel gas equipment, we urge you to read ESAB booklet "Precautions and Safe Practices for Welding, Cutting and Heating," Form 2035. Do NOT permit untrained persons to operate this equipment. DO NOT attempt to operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information.

The cutting torches covered by these instructions are listed by Underwriter's Laboratories only when using parts manufactured to ESAB Welding & Cutting Products specifications on file with Underwriter's Laboratories, Inc., and when they are used in the gas service for which they are designed and listed. The use of other parts that cause damage or failure to the equipment will void the manufacturer's warranty.

OPERATING INSTRUCTIONS

The C-66-1400 torch is an enhanced version of the well-established OXWELD C-66 torch. It is equipped with a "C" size oxygen inlet and designed for use with the larger OXWELD 1400 series cutting nozzles.



The C-66-1400 can be used with any fuel gas EXCEPT acetylene. Use of acetylene can cause a flashback which can cause serious burns and damage the torch.

Be sure gas flow is sufficient for nozzle size.

Adjust regulators for proper psig pressures.

Adjust throttle valves properly.

Keep torch in good repair.

DO NOT throttle back gases to use large nozzle on thin material.

CONNECTING

1. To obtain the best performance from the torch, 1/2-in. oxygen hose with standard "C" size fittings, such as P/N 2120399 (50-ft.) must be used. Attach 1/2-in. oxygen hose to the oxygen regulator; attach 3/8-in. fuel gas hose, such as P/N 2060397 (50-ft.) to the fuel gas regulator.

Note: 3/8-in. oxygen hose with "B" size connectors may be used but torch performance will be reduced. To use 3/8-in. oxygen hose order P/N 18X19 "C" to "B" adaptor.

2. Using Regulation Panel (recommended) – Attach supply hoses to outlets of regulation panel and to torch inlets.
3. Using regulators – Attach oxygen and fuel gas regulators to the supply station outlets; attach supply hoses to regulators and to torch inlets.
4. Attach nozzle to torch head and tighten connection nut with a wrench.
5. Check throttle valve packing nuts for tightness.

ADJUSTING GAS PRESSURES

Fuel Gas: If fuel gas is supplied from a station outlet without a regulator, merely open the station valve. If fuel gas is being supplied through a station or cylinder regulator, open the fuel gas valve on the torch, turn in the pressure-adjusting screw on the regulator until the regulator delivery-pressure gauge indicates the desired pressure (see chart on page 4).

Oxygen: Open the cutting oxygen valve by depressing its valve lever fully. Turn in the pressure-adjusting screw until the regulator delivery gauge registers the desired pressure (see cutting chart on page 4). Then release the cutting oxygen lever.

**Be sure this information reaches the operator.
You can get extra copies through your supplier.**



ESAB Welding &
Cutting Products

SAFETY PRECAUTIONS

WARNING

These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.



PROTECT YOURSELF AND OTHERS - Some welding, cutting and gouging processes are noisy and require ear protection. Hot metal can cause skin burns and heat rays may injure eyes. Training in the proper use of the processes and equipment is essential to prevent accidents. Also:

1. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, or goggles are also required.
2. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to protect against hot sparks and hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
3. Hot sparks or metal can lodge in rolled up sleeves, trousers cuffs, or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing.
4. Protect other personnel from hot sparks with a suitable non-flammable partition or curtains.
5. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can travel considerable distances. Bystanders should also wear goggles over safety glasses.



FIRES AND EXPLOSIONS - Heat from a flame can act as an ignition source. Hot slag or sparks can also cause fires or explosions. Therefore:

1. Remove all combustible materials well away from the work area or completely cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
2. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire on the floor below. Make certain that such openings are protected from hot sparks and metal.
3. Do not weld, cut, or perform any other hot work on materials, containers, or piping until it has been completely cleaned so that no substances on the material can produce flammable or toxic vapors. Do not do hot work on closed containers. They may explode.
4. Have fire extinguishing equipment handy for instant use, such as a garden hose, a pail of water or sand, or portable fire extinguisher. Be sure you are trained in its use.
5. After completing operations, inspect the work area to be sure that there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.
6. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", which is available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.



FUMES AND GASES - Fumes and gases, particularly in confined spaces, can cause discomfort or injury. Do not breathe fumes or gases from welding or cutting. Therefore:

1. Always provide adequate ventilation in the work area by natural or mechanical ventilation means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes and gases from these materials.
2. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work at once and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.

3. Refer to ANSI/ASC Standard Z49.1 listed below for specific ventilation recommendations.
4. **WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code §25249.5 et seq.)



EQUIPMENT MAINTENANCE - Faulty or improperly maintained equipment, such as torches, hoses and regulators, can result in poor work, but even more important, it can cause injury or death through fires. Therefore:

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not operate or repair any equipment unless you are qualified to do so.
2. Keep all oxy-fuel equipment free of grease or oil. Grease, oil, and other similar combustible materials, when ignited, can burn violently in the presence of oxygen.
3. Do not abuse any equipment or accessories. Keep equipment away from heat and wet conditions, oil or grease, corrosive atmospheres and inclement weather.
4. Keep all safety devices in position and in good repair.
5. Use equipment for its intended purpose. Do not modify it in any manner.



GAS CYLINDER HANDLING - Gas cylinders, if mishandled, can rupture or explode violently. Sudden rupture of a cylinder, valve or relief device can injure or kill you. Therefore:

1. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors to mount the regulator on the cylinder. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting the regulator to the gas cylinder.
2. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.
3. When not in use, keep cylinder valves closed. Have the valve protection cap in place on top of the cylinder if no regulators is installed. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.
4. Locate cylinders away from heat, sparks, or flame of a welding, cutting, or gouging operation. Never strike an arc on a cylinder.
5. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from the Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.



ADDITIONAL SAFETY INFORMATION - For more information on safe practices for oxy-fuel welding and cutting equipment, ask your distributor for a copy of "Precautions and Safe Practices for Gas Welding, Cutting, and Heating", Form 2035. Gas apparatus safety guidelines are also available on video cassettes from your distributor.

The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, are recommended to you:

1. ANSI/AWS Z49.1 - "Safety in Welding and Cutting".
2. AWS F4.1 - "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances".
3. AWS SP - "Safe Practices" - Reprint, Welding Handbook.



MEANING OF SYMBOLS - As used throughout this manual: Means Attention! Be Alert! Your safety is involved.



DANGER Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.



WARNING Means potential hazards which could result in personal injury or loss of life.



CAUTION Means hazards which could result in minor personal injury.

*Note: The gas pressures given in the cutting chart on page 4 are measured at the torch inlet connections **with gases flowing**. Since Pressure drop through the hose can vary appreciably due to nozzle size flow requirements, length and condition of hose, the use of test gauge adaptors (P/N 21X48 for oxygen and P/N 639422 for fuel gas) connected between hose and torch connection is recommended. The test gauges can be removed after the regulator pressures have been determined.*

TESTING FOR LEAKS

Every cutting outfit should be thoroughly tested for leaks after it is first hooked up, and at regular intervals thereafter. After all connections have been made, make sure all valves on the torch handle are closed. Then adjust regulators, or open station valves, to apply 60 psi oxygen and up to 10 psi fuel gas pressure on the hoses.

Using Leak Test Solution (P/N 998771), or any other solution suitable for oxygen service, check for leaks at the gas supply valves, the gas supply-to-regulator connections, the regulator-to-hose connections, and the hose-to-torch connections. If bubbling at any point indicates leakage, close the appropriate supply valve, open the corresponding torch valve to remove all pressure from the line, and finally release the regulator pressure adjusting screw by turning it counter-clockwise; then break the leaky connection, wipe metal seating surfaces with a clean dry cloth, and examine them for nicks and scratches. Remake the connection(s) and re-test. Do not try to light the torch until you are satisfied that all connections are gas-tight.

After lighting the torch and adjusting the flames, use leak test solution to check for leakage at all torch valves and at the nozzle nut.

LIGHTING AND FLAME ADJUSTMENT

1. Open the preheat oxygen valve one turn or less.
2. Open the fuel gas valve wide (two turns) and light the gas at the nozzle with a friction lighter. **DO NOT USE A MATCH.** Use of a match can seriously burn your hand.
3. Then open the cutting oxygen valve and adjust flames with preheat valve. Flames are hottest when inner cones are shortest. Do not throttle the fuel gas valve unless flames blow off or burn away from end of nozzle.

NOTE: Because of the several factors involved (injector, nozzle size, gas pressures) the adjustment procedures given above do not apply in all situations. However, this is a good rule-of-thumb if you want preheat flames at maximum effectiveness. You should usually be able to keep one preheat valve wide open if regulator pressure has been set correctly for the nozzle in use.

SHUTTING OFF

Release the cutting oxygen lever. Then close the fuel gas valve, and finally the preheat oxygen valve.

If operations are to be stopped for half-hour or more, all pressure should be released from the torch, hoses, and regulators by doing the following:

1. Close each supply or station valve.
2. Open torch valves.
3. After relieving the gases, back out the pressure-adjusting screw of each regulator and close the torch valves.

OPERATING PRECAUTIONS

Flow: There must be proper flow of gases for safe operation and full performance. This requires the following three conditions: (1) the regulators that determine the inlet pressure to the hoses must be set to the correct pressure; (2) the hoses and their connectors must have adequate capacity for the job (hoses that are too long, too small or have connectors with small passageways can cause problems); and (3) the throttle valves on the torch must be adjusted with the procedure shown in these instructions.

Note: Items (1) and (2) can be checked by measuring the gas pressures at the torch with gases flowing. Gauge adaptors are available for this purpose (see "Adjusting Gas Pressures").

Backfire: Improper operation of the torch may cause the flames to go out with a loud "pop". Such a backfire may be caused by contact of nozzle with the work, spatter from the work, by the use of improper gas pressures, or by leakage at the cutting nozzle seats due to nicks on seats or to a loose nozzle nut.

Flashback: Under certain circumstances, the flame may not "pop" out (backfire) but instead burn back inside the torch with a shrill hissing or squeal. This is called a "flashback". A flashback should never occur if (1) the equipment is in good condition; (2) preheat ports on cutting nozzles are cleaned frequently; (3) operating pressure are correct; (4) throttle valves are adjusted properly. Should a flashback occur, **IMMEDIATELY** shut off the torch. Allow it to cool for at least a minute. Then check your nozzle, gas pressure, re-adjust regulators if necessary, and relight the torch. If flashback recurs, send the torch to ESAB Remanufacturing Center, 411 S. Ebenezer Road, Florence, SC 29501 for repair.

OPERATING DATA, CLEANING DATA, & PART NUMBERS

GENERAL NOTES:

1. Pressures given are measured at the torch with gases flowing; therefore pressure drop through the hoses should be considered when setting pressures at the regulators.
2. The table shows average values based on typical conditions. The type and quality of steel, its surface condition, the purity of the oxygen, etc. will always have a bearing on the end results.
3. Use ½-in. size hose for oxygen and 3/8-in. hose for fuel gas.

OXWELD 1427 Series Natural Gas Nozzles - Non-Metric Dimensions

Nozzle		Steel Thickness, In.	Gas Pressure, psig			Cutting Speed, In./min.	Cleaning Drill Size		Gas Consumption, cfh		
Size	Part No.		Cutting Oxygen	Preheat Oxygen	Natural Gas		Preheat	Cutting	Cutting Oxygen	Preheat Oxygen	Natural Gas
12	5470099	12	75-85	8-10	16-19	4-5	55	31	800-900	100-115	65-75
14	5470144	14	60-70	7-9	8-11	3.5-4.5	54	28	950-1100	115-140	75-95
16	5470100	16	55-65	9-12	11-15	3-4.5	53	20	1150-1330	145-175	95-115
20	5460192	20	45-55	13-18	17-23	2.5-4	52	8	1450-1700	170-225	125-150
24	5460162	24	40-50	21-25	28-33	2-3.5	51	C	1850-2200	225-285	170-190
28	5460193	28	30-40	28-33	39-45	2-3.5	50	K	1950-2400	315-350	210-235

OXWELD 1427 Series Natural Gas Nozzles - Metric Dimensions

Nozzle		Steel Thickness, mm	Gas Pressure, bars			Cutting Speed, mm/min.	Cleaning Drill Size		Gas Consumption, m ³ /hr		
Size	Part No.		Cutting Oxygen	Preheat Oxygen	Natural Gas		Preheat	Cutting	Cutting Oxygen	Preheat Oxygen	Natural Gas
12	5470099	300	5.3-6.0	0.6-0.7	1.1-1.3	100-125	55	31	22.7-25.5	2.8-3.3	1.8-2.1
14	5470144	350	4.2-4.9	0.5-0.6	0.6-0.8	90-115	54	28	26.9-31.2	3.3-4.0	2.1-2.7
16	5470100	400	3.9-4.6	0.6-0.8	0.8-1.1	75-115	53	20	32.6-37.7	4.1-5.0	2.7-3.3
20	5460192	500	3.2-3.9	0.9-1.3	1.2-2.3	65-100	52	8	41.1-48.0	4.8-6.4	3.5-4.2
24	5460162	600	2.8-3.5	1.5-1.8	2.0-2.3	50-90	51	C	52.4-62.3	7.2-8.1	4.8-5.4
28	5460193	700	2.1-2.8	2.0-2.8	2.7-3.2	50-90	50	K	55.2-68.0	8.9-9.9	5.9-6.7

MAINTENANCE INSTRUCTIONS

For all repairs other than those covered below, send the apparatus to the nearest ESAB distributor or to ESAB Remanufacturing Center, 411 S. Ebenezer Road, Florence, SC 29501. Improperly repaired apparatus is hazardous.

Preheat Valves: Leakage around either throttle valve can usually be corrected by tightening packing nut slightly. If this does not stop the leakage, replace the valve assembly.

If either preheat valve fails to shut off completely, remove the valve assembly from the torch. With clean cloth, wipe the ball in the end of the stem. Then reinsert valve assembly and tighten it several times with maximum force. If this not eliminate leakage, try a new valve stem assembly. If then the valve does not shut off completely, send the torch to a repair station for reseating of the body.

After installing a new throttle valve assembly, tighten the packing nut until the valve can be turned with great difficulty, and set the unit aside, for three or four hours at least, to set the packing. Then back off the packing nut until the valve turns readily.

Cutting Valve: If leakage develops around the cutting valve stem or between the cutting valve guide and the torch body, or if the cutting valve fails to shut off completely, proceed as follows:

1. Remove cutting valve lever by merely driving out the fulcrum spiral-pin, using a drill or piece of rod (7/32-in. dia. or smaller).
2. Unscrew cutting valve guide and lift out entire valve assembly: guide (with external and internal O-rings) valve stem, spring, and O-ring retaining washer.

3. Pull stem out of guide. Replace it with new part unless the molded rubber seat appears to be in excellent condition.
4. Remove the internal O-ring (85W10) from the guide and insert a new O-ring. Replace the external O-ring (86W70) if it shows distinct signs of wear.
5. Reassemble by placing retaining washer and spring in guide, then placing stem through spring and O-ring in guide.
6. Screw valve assembly into body. Before reassembling cutting lever, connect torch to oxygen source, apply at least 60 psi pressure, and check for leakage through valve, around stem, and around the guide.
7. Reassemble cutting lever to torch.

Injector: To remove the injector for inspection or replacement, first unscrew the injector chamber plug and remove the injector spring. Then run a long No. 10-32 machine screw into the threads in the end of the injector and withdraw the injector by pulling on the screw.

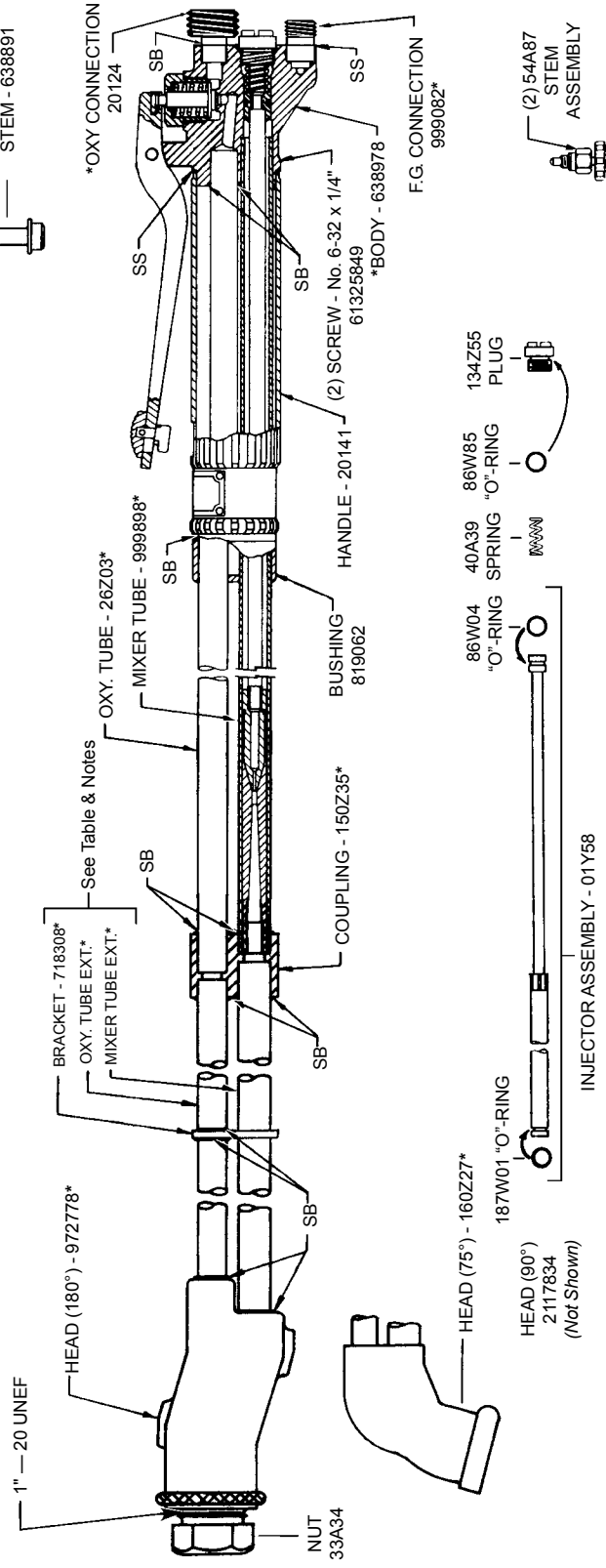
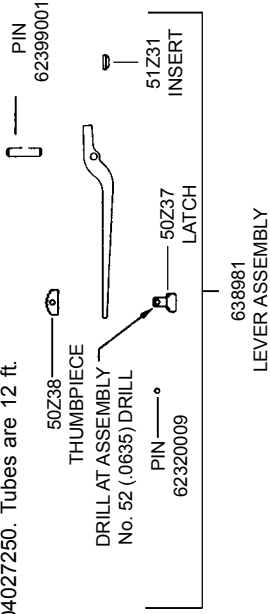
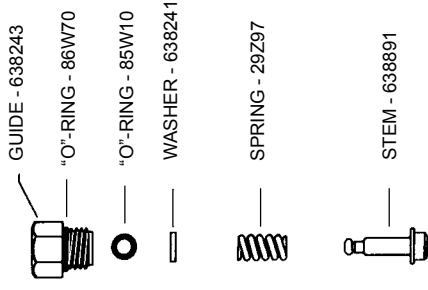
Before reinstalling a previously-used injector, be sure that the O-rings at each end of the injector assembly are in good condition. Replace them if necessary. Also be sure the injector chamber plug is fitted with an O-ring in good condition.

Cleaning Cutting Nozzles: Cutting nozzle orifices should be cleaned by hand using OXWELD tip cleaners, whenever a flame distortion is noticed. Maintaining clean orifices is highly recommended for reducing any incidence of flashbacks. If you do not have tip cleaners, twist drills of the correct sizes (see table on pg. 4) may be used. Insert the drill carefully, and push it back and forth. DO NOT TWIST THE DRILL.

NOTES:

1. "SB" and "SS" indicate silver brazed and soft solder joints. Parts that are silver brazed (indicated by *) should be replaced only by an authorized ESAB distributor repair facility or by ESAB Remanufacturing Center, 411 S. Ebenezer Rd., Florence, SC 29501.
2. Brackets 718308, are equally spaced between head and coupling. Also, oxygen tube extension must be cut back 7/8" if using the 180-degree head.
3. Oxy. Tube Ext. - Order 04027232, Mixer Tube Ext. - Order 04027250. Tubes are 12 ft. Long and must be cut to proper length.

ACCESSORIES: Nozzle Reseating Tool - 5230151
 1" - 20 Tap - 49228100



C-66-1400 Cutting Torches Assemblies

32-in. - 75-deg. Head	Part No. 718317	48-in. - 180-deg. Head	Part No. 718322
32-in. - 180-deg. Head	Part No. 718318	60-in. - 75-deg. Head	Part No. 718323
42-in. - 75-deg. Head	Part No. 718319	60-in. - 180-deg. Head	Part No. 718324
42-in. - 180-deg. Head	Part No. 718320	72-in. - 75-deg. Head	Part No. 718325
48-in. - 75-deg. Head	Part No. 718321	72-in. - 180-deg. Head	Part No. 718326

For other available lengths of C-66-1400 torches contact your salesman or ESAB distributor.

**ESAB Welding & Cutting Products, Florence, SC Welding Equipment
COMMUNICATION GUIDE - CUSTOMER SERVICES**

A. CUSTOMER SERVICE QUESTIONS:

Order Entry	Product Availability	Pricing	Delivery
Order Changes	Saleable Goods Returns	Shipping Information	

Eastern Distribution Center

Telephone: (800)362-7080 / Fax: (800) 634-7548

Central Distribution Center

Telephone: (800)783-5360 / Fax: (800) 783-5362

Western Distribution Center

Telephone: (800) 235-4012/ Fax: (888) 586-4670

B. ENGINEERING SERVICE: Telephone: (843) 664-4416 / Fax : (800) 446-5693

Welding Equipment Troubleshooting	Hours: 7:30 AM to 5:00 PM EST
Warranty Returns	Authorized Repair Stations

C. TECHNICAL SERVICE: Telephone: (800) ESAB-123/ Fax: (843) 664-4452

Part Numbers	Technical Applications	Hours: 8:00 AM to 5:00 PM EST
Performance Features	Technical Specifications	Equipment Recommendations

D. LITERATURE REQUESTS: Telephone: (843) 664-5562 / Fax: (843) 664-5548

Hours: 7:30 AM to 4:00 PM EST

E. WELDING EQUIPMENT REPAIRS: Telephone: (843) 664-4487 / Fax: (843) 664-5557

Repair Estimates	Repair Status	Hours: 7:30 AM to 3:30 PM EST
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F. WELDING EQUIPMENT TRAINING:

Telephone: (843)664-4428 / Fax: (843) 679-5864	
Training School Information and Registrations	Hours: 7:30 AM to 4:00 PM EST

G. WELDING PROCESS ASSISTANCE:

Telephone: (800) ESAB-123 / Fax: (843) 664-4454	Hours: 7:30 AM to 4:00 PM EST
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H. TECHNICAL ASST. CONSUMABLES:

Telephone : (800) 933-7070	Hours: 7:30 AM to 5:00 PM EST
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IF YOU DO NOT KNOW WHOM TO CALL

Telephone: (800) ESAB-123/ Fax: (843) 664-4452/ Web:<http://www.esab.com>

Hours: 7:30 AM to 5:00 PM EST

