220 TIG AC/DC WELDER OPERATING MANUAL

FEATURES:

- 230V Input; 200A Output
- TIG functions - High Frequency, Pulse (PPS, % On, Base Current), AC Frequency, AC Balance, Pre-flow, Post-flow, Crater Fill, Ramp Up/Down, Foot Pedal or Panel Control, Lift Arc Capable, 20 Default Programs, 20 User Defined Programs
- Stick functions - Hot Start, Arc Force

IDEAL FOR:

Automotive, Motorcycles, Stainless and Aluminum Fabrication or Repair

INCLUDES:

Machine only

FORNEY INDUSTRIES

WELDING IN AMERICA.
SINCE THE BEGINNING.

5/3/1 WARRANTY

CAT# 325

REV 04.14.2017

FIVE WAYS TO ORDER

Web: www.forneyind.com

Phone: 800-521-6038

Fax: 970-498-9505

Mail: Forney Industries
2057 Vermont Drive
Fort Collins, CO 80525

Email: sales@forneyind.com

U.S. Warehouses:
- Fort Collins, CO
- Tipp City, OH

Forney Promise

We are committed to your success regardless of location, size or needs. We understand it is your goal to get the job done right, and we are ready to help you do just that.

President's Message

We market the highest quality tools, equipment and accessories for the do-it-yourselfer and professional. Our passion and dedication in bringing new products to the industrial and retail market, combined with our personal service, is unmatched in our industry. Our ability to listen to our customers' needs enables us to create solutions to their problems.

Our dedication to the highest quality customer service within our corporate headquarters and the service provided in the field is unequaled. We are committed to creating the best solutions to our customer's needs. Above all, our employees will provide the same respect and caring attitude within the organization as they are expected to share with every Forney customer. Our goal will be to exceed our customers' expectations through empowered people, guided by shared values and commitments.

We work hard so our customers trust us because of our integrity, teamwork and innovation of Forney products, and Forney's 80 years of unmatched product quality and an unwavering commitment to our customers.

When our customers succeed we succeed.

STEVEN G. ANDERSON, President & CEO

STOP!
PLEASE DO NOT RETURN TO THE STORE

If you have questions or problems with your new plasma cutter, please call customer service at **1-800-521-6038** Monday through Friday from 7 a.m. - 5 p.m. (MST) or at www.forneyind.com/about-us/contact-us.

Please take time to register your product at www.forneyind.com/support/product-registration.

Thank you and enjoy your new welder.

For the most up-to-date warranty information, visit www.forneyind.com

CAUTION!

BEFORE INSTALLING, OPERATING OR CARRYING OUT MAINTENANCE ON THE MACHINE, READ THE CONTENTS OF THIS MANUAL CAREFULLY, PAYING PARTICULAR ATTENTION TO THE SAFETY RULES AND HAZARDS.

In the event of these instructions not being clear, please contact your Forney Authorized Dealer or Forney Customer Service 1-800-521-6038

Safety Summary

Principal Safety Standards

- Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 8669 Doral Boulevard, Suite 130, Doral, FL 33166 Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
- Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 8669 Doral Boulevard, Suite 130, Doral, FL 33166
- National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
- Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.
- Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.
- Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.
- Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269

California Proposition 65 Warning

⚠ **WARNING:** This product can expose you to chemicals including lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov. P65 details at forneyind.com. Wash hands after use.

EMF Information

Welding or cutting current, as it flows through the welding or cutting cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examination the committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and a magnetic field is a human health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding or cutting power source and cables as far away from operator as practical.
5. Connect work clamp to work piece as close to the cut or weld as possible.

ABOUT PACEMAKERS & HEARING AIDS:

Pacemaker & Hearing Aid wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

Personal Protection

Welding processes of any kind can be dangerous not only to the operator but to any person situated near the equipment, if safety and operating rules are not strictly observed.

THE WELDING ARC PRODUCES VERY BRIGHT ULTRAVIOLET AND INFRARED LIGHT. THESE ARC RAYS WILL DAMAGE YOUR EYES AND BURN YOUR SKIN IF YOU ARE NOT PROPERLY PROTECTED. To reduce the risk of injury from arc rays, read, understand, and follow the safety instructions. In addition, make certain that anyone else that uses this welding equipment, or is a bystander in the welding area understands and follows these safety instructions as well. Helmets and filter should conform to ANZI 287.1 standards.

- Do not look at an electric arc without proper protection. A welding arc is extremely bright and intense and, with inadequate or no eye protection, the retina can be burned, leaving a permanent dark spot in the field of vision. A shield or helmet with a #10 shade filter lens (minimum) must be used.
- Do not strike a welding arc until all bystanders and you (the welder) have welding shields and/or helmets in place.
- Do not wear a cracked or broken helmet and replace any cracked or broken filter lenses immediately.
- Do not allow the uninsulated portion of the wire feed gun to touch the ground clamp or grounded work to prevent an arc flash from being created on contact.
- Provide bystanders with shields or helmets fitted with an appropriate shade filter lens.
- Wear protective clothing. The intense light of the welding arc can burn the skin in much the same way as the sun, even through light-weight clothing. Wear dark clothing of heavy material. The shirt worn should be long sleeved and the collar kept buttoned to protect chest and neck.
- Protect against reflected arc rays. Arc rays can be reflected off shiny surfaces such as a glossy painted surface, aluminum, stainless steel, and glass. It is possible for your eyes to be injured by reflected arc rays even when wearing a protective helmet or shield. If welding with a reflective surface behind you, arc rays can bounce off the surface and off the filter lens. It can get inside your helmet or shield and into your eyes. If a reflective background exists in your welding area, either remove it or cover it with something non-flammable and non-reflective. Reflective arc rays can also cause skin burn in addition to eye injury.
- Flying sparks can injure. Wear proper safety equipment to protect eyes and face. Shape tungsten electrode on grinder wearing proper protection and in a safe location. Keep flammables away and prevent fire from flying sparks.

FUMES, GASSES, AND VAPORS CAN CAUSE DISCOMFORT, ILLNESS, AND DEATH! To reduce the risk, read, understand, and follow the safety instructions. In addition, make certain that anyone else that uses this welding equipment or is a bystander in the welding area, understands and follows these safety instructions as well.

- Read and understand manufacturers SDS and MSDS.
- Do not weld in an area until it is checked for adequate ventilation as described in ANSI standard Z49.1. If ventilation is not adequate to exchange all fumes and gasses generated during the welding process with fresh air, do not weld unless you (the welder) and all bystanders are wearing air-supplied respirators.
- Do not heat metals coated with, or that contain, materials that produce toxic fumes (such as galvanized steel), unless the coating is removed. Make certain the area is well ventilated, and the operator and all bystanders are wearing air-sup plied respirators.
- Do not weld, cut or heat lead, zinc, cadmium, mercury, beryllium, antimony, cobalt, manganese, selenium, arsenic, copper, silver, barium, chromium, vanadium, nickel, or similar metals without seeking professional advice and inspection of the ventilation of the welding

area. These metals produce extremely toxic fumes which can cause discomfort, illness and death.

- Do not weld or cut in areas that are near chlorinated solvents. Vapors from chlorinated hydrocarbons, such as trichloroethylene and perchloroethylene, can be decomposed by the heat of an electric arc or its ultraviolet radiation. These actions can cause phosgene, a highly toxic gas, to form, along with other lung and eye-irritating gasses. Do not weld or cut where these solvent vapors can be drawn into the work area or where the ultraviolet radiation can penetrate to areas containing even very small amounts of these vapors.
- Do not weld in a confined area unless it is being ventilated or the operator (and anyone else in the area) is wearing an air-supplied respirator.
- Stop welding if you develop momentary eye, nose, or throat irritation as this indicates inadequate ventilation. Stop work and take necessary steps to improve ventilation in the welding area. Do not resume welding if physical discomfort persists.

Fire Prevention

FIRE OR EXPLOSION CAN CAUSE DEATH, INJURY, AND PROPERTY DAMAGE!
To reduce these risks, read, understand and follow the safety instructions. In addition, make certain that anyone else that uses this welding equipment, or is a bystander in the welding area, understands and follows these safety instructions as well. Remember: arc welding by nature produces sparks, hot spatter, molten metal drops, hot slag and hot metal parts that can start fires, burn skin and damage eyes.

- Do not wear gloves or other clothing that contains oil, grease, or other flammable substances.
- Do not wear flammable hair preparations.
- Do not touch the hot weld bead or weld puddle until fully cooled.
- Do not weld in an area until it is checked and cleared of combustible and/or flammable materials. Be aware that sparks and slag can fly 35 feet and can pass through small cracks and openings. If work and combustibles cannot be separated by a minimum of 35 feet, protect against ignition with suitable, snug-fitting, fire resistant, covers or shields.
- Do not weld on walls until checking for and removing combustibles touching the other side of the walls.
- Do not weld, cut, or perform other such work on used barrels, drums, tanks, or other containers that had a flammable or toxic substance. The techniques for removing flammable substance and vapors, to make a used container safe for welding or cutting, are quite complex and require special education and training.
- Do not strike an arc on a compressed gas or air cylinder. Doing so will create a brittle area that can result in a violent rupture immediately or at a later time as a result of rough handling.
- Do not weld or cut in an area where the air may contain flammable dust (such as grain dust), gas, or liquid vapors (such as gasoline).
- Do not handle hot metal, such as the work piece or electrode stubs, with bare hands.
- Wear leather gloves, heavy long sleeve shirt, cuffless pants, high-topped shoes, helmet, and cap. As necessary, use additional protective clothing such as leather jacket or sleeves, fire resistant leggings, or apron. Hot sparks or metal can lodge in rolled up sleeves, pant cuffs, or pockets. Sleeves and collars should be kept buttoned and pockets eliminated from the shirt front.
- Have fire extinguisher equipment handy for immediate use. A portable chemical fire extinguisher, type ABC, is recommended.
- Wear ear plugs when welding overhead to prevent spatter or slag from falling into ear.
- Make sure welding area has a good, solid, safe floor, preferably concrete or masonry, not tiled, carpeted, or made of any other flammable material.
- Protect flammable walls, ceilings, and floors with heat resistant covers or shields.

- Check welding area to make sure it is free of sparks, glowing metal or slag, and flames before leaving the welding area.
- Wear garments free of oil or other flammable substances such as leather gloves, thick cotton shirts with no synthetic materials, cuffless trousers, closed toed shoes. Keep long hair pulled back.
- Remove any combustibles such as lighters and matches before doing any welding.
- Follow requirements in OSHA and NFPA for hot work and have an extinguisher nearby.

High Frequency Radiation

- High Frequency (H.F) can interfere with radio navigation, safety services, computers and communication equipment.
- It is the user's responsibility to have a qualified electrician promptly correct any interference problem resulting from the installation. Electrician should regularly check and maintain installation.
- Stop using the equipment if notified by the FCC about interference.
- Keep H.F. source doors and panels tightly shut and keep spark gaps at correct setting.

Arc Welding

- Computers and computer driven equipment can be harmed with electromagnetic energy.
- Be sure all equipment is compatible with electromagnetic energy.
- Keep welding cables short to reduce interference.
- Follow manual to install and ground machine.
- If interference continues, shield the work area or move the welding machine.

Electric Shock

WARNING: ELECTRIC SHOCK CAN KILL! To reduce the risk of death or serious injury from shock, read, understand, and follow the safety instructions. In addition, make certain that anyone else who uses this welding equipment, or who is a bystander in the welding area understands and follows these safety instructions as well.

IMPORTANT! TO REDUCE THE RISK OF DEATH, INJURY, OR PROPERTY DAMAGE, DO NOT ATTEMPT OPERATION of this welding equipment until you have read and understand the following safety summary.

- Do not, in any manner, come into physical contact with any part of the welding current circuit. The welding current circuit includes:
    a. the work piece or any conductive material in contact with it,
    b. the ground clamp,
    c. the electrode or welding wire,
    d. any metal parts on the electrode holder, or wire feed gun.
- Do not weld in a damp area or come in contact with a moist or wet surface.
- Do not attempt to weld if any part of clothing or body is wet.
- Do not allow the welding equipment to come in contact with water or moisture.
- Do not drag welding cables, wire feed gun, or welder power cord through or allow them to come into contact with water or moisture.
- Do not touch welder, attempt to turn welder on or off if any part of the body or clothing is moist or if you are in physical contact with water or moisture.
- Do not attempt to plug the welder into the power source if any part of body or clothing is moist, or if you are in physical contact with water or moisture.
- Do not connect welder work piece clamp to or weld on electrical conduit.
- Do not alter power cord or power cord plug in any way.

- Do not attempt to plug the welder into the power source if the ground prong on power cord plug is bent over, broken off, or missing.
- Do not allow the welder to be connected to the power source or attempt to weld if the welder, welding cables, welding site, or welder power cord are exposed to any form of atmospheric precipitation, or salt water spray.
- Do not carry coiled welding cables around shoulders, or any other part of the body, when they are plugged into the welder.
- Do not modify any wiring, ground connections, switches, or fuses in this welding equipment.
- Wear welding gloves to help insulate hands from welding circuit.
- Keep all liquid containers far enough away from the welder and work area so that if spilled, the liquid cannot possibly come in contact with any part of the welder or electrical welding circuit.
- Replace any cracked or damaged parts that are insulated or act as insulators such as welding cables, power cord, or electrode holder immediately.

Noise

Noise can cause permanent hearing loss. Welding processes can cause noise levels that exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.

- To protect your hearing from loud noise, wear protective ear plugs and/or ear muffs.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.

Additional Safety Information

For additional information concerning welding safety, refer to the following standards and comply with them as applicable.

- ANSI Standard Z49.1 - SAFETY IN WELDING AND CUTTING - obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 443-7559 - www.amweld.org or www.aws.org
- ANSI Standard Z87.1 - SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION - obtainable from the American National Standards Institute, 11 West 42nd St., New York, NY 10036 Telephone (212) 642A900, Fax (212) 398-0023 - www.ansi.org
- NFPA Standard 518 - CUTTING AND WELDING PROCESS - obtainable from the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101 Telephone (617) 770-3000 Fax (617) 770-0700 - www.nfpa.org
- OSHA Standard 29 CFR, Part 1910, Subpart Q., WELDING, CUTTING AND BRAZING - obtainable from your state OSHA office or U.S. Dept. of Labor OSHA, Office of Public Affairs, Room N3647, 200 Constitution Ave., Washington, DC 20210 - www.osha.gov
- CSA Standard W117.2 - Code for SAFE TY IN WELDING AND CUTTING. - obtainable from Canadian Standards Association, 178 Rexdale Blvd., Etobicoke, Ontario M9W 1R3 - www.csa.ca
- American Welding Society Standard A6.0. WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES. - obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 443-7559 - www.amweld.org or www.aws.org

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Installation

Welder Specifications

Please refer to the plate on the back/bottom of the machine.

Site Selection

Select a clean, dry location with adequate working space around all components. Provide at least two feet of space in front of and behind the unit to allow for free flow of air. Due to the high frequency generator within the machine, radio interference may occur with electronic equipment. To reduce or eliminate potential interference, properly ground the machine.

Power Source Connection

Power Requirements
This welder is designed to operate on a properly grounded 230V, 60HZ, single-phase alternating current (AC) power source fused with a 50A time delayed fuse or circuit breaker.

It is recommended that a qualified electrician verify the actual voltage at the receptacle into which the welder will be plugged and confirm the receptacle is properly fused and grounded. The use of the proper circuit size can eliminate nuisance circuit breaker tripping when welding.

The voltage requirements for this machine are 220 VAC +/- 10%. Contact a qualified electrician if a problem exists. Improper performance and/or damage to the welder will result if operated on inadequate or excessive power.

Operation

Description

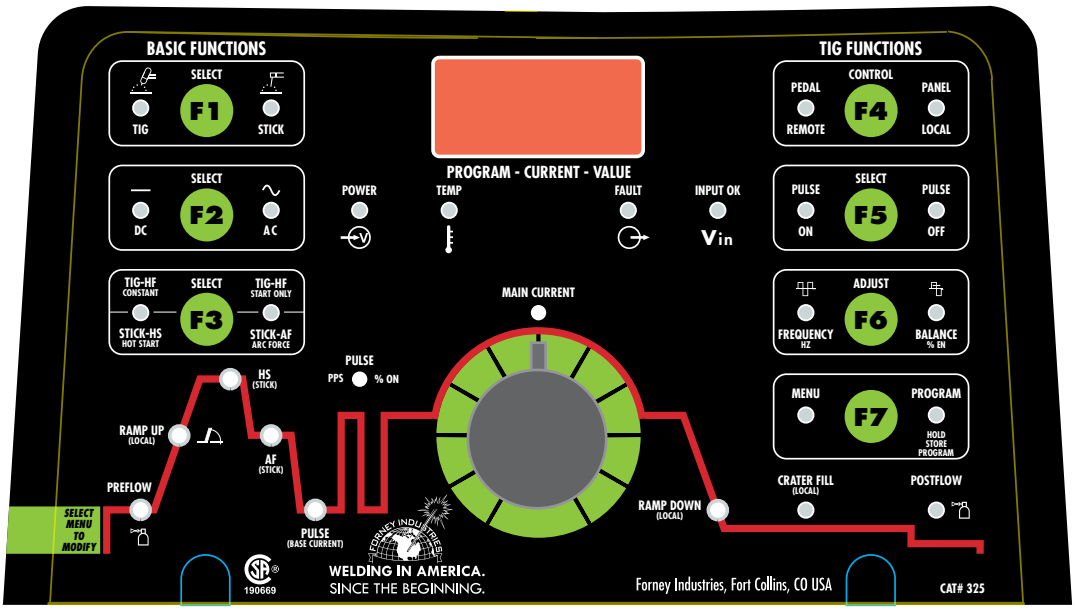
The 220 TIG AC/DC single-phase, constant current, inverter welder is designed for portable use on jobs involving maintenance, fabrication, and construction. This versatile arc welding power source allows for a high degree of user adjustability in both Stick and TIG processes. Some highlights of the 220 TIG AC/DC include:

- TIG functions - High Frequency, Pulse (PPS, % On, Base Current), Frequency, Balance, Pre-flow, Post-flow, Crater Fill, Ramp Up/Down, Foot Pedal or Panel Control, Lift Arc Capable, 20 Default Programs, 20 User Defined Programs
- Stick functions - Hot Start, Arc Force, Main Current

Thermal Overload Protection

CAUTION
If the duty cycle of the welder is exceeded, a thermostat will automatically cut the power to prevent the machine from overheating. If this should happen do not unplug the machine while it cools down. The thermostat will automatically reset itself and you can continue welding. The thermostat is a protective safety device and no harm will normally be done to the welder unless it is frequently over loaded, in which case damage will eventually result. For this model the intervention of the thermostat is indicated by the lighting of the indicator fault light.

Parameter Controls



MAIN DISPLAY will show the following:

- Current (STICK)
- Program # (TIG)

DIAL – used select and make adjustments to values for parameter modification

POWER LED – machine is powered on and operating normally

TEMPERATURE FAULT LED – thermal overload protection has been activated

OUTPUT FAULT LED – there is a general welding or machine fault

INPUT VOLTAGE STATUS LED – input voltage is sufficient

F1 – Process selector

F2 – Polarity control

F3 – High Frequency (HF) control [TIG mode];
Hot Start/Arc Force control [STICK mode]

F4 – Remote/Local control

F5 – Pulse control

F6 – Frequency/Balance control

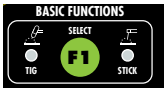
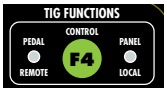
F7 – Menu/Program control (for modifying TIG parameters)

F1-F6 gives up-front control of most commonly used functions.

F7 sub-menu steps through remaining advanced functions

1. **MAIN CURRENT**
2. **PREFLOW**
3. **RAMP UP**
   ***NOTE:** only available on Panel Control
4. **PULSE (BASE CURRENT)**
5. **PULSE (PPS / % ON)**
   ***NOTE:** requires 2 touches of MENU
6. **RAMP DOWN**
   ***NOTE:** only available on Panel Control
7. **CRATER FILL**
   ***NOTE:** only available on Panel Control
8. **POSTFLOW**

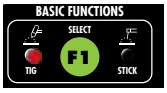
Function Button Descriptions

FUNCTION SELECTION	BASIC FUNCTION DESCRIPTIONS		ADVANCED FUNCTION DETAILS	
	• TIG • STICK		Selects either TIG or STICK welding process	
	• DC output • AC output		Sets the output polarity to either DC or AC for TIG welding. Not available for STICK welding.	
	**TIG:** • **HF CONSTANT** = HF on the entire weld • **HF START ONLY** = HF on only for the start of the weld • **HF OFF** = To turn off, hold for 3 seconds	**STICK:** • HS = Hot Start • AF = Arc Force	**TIG:** Controls High Frequency settings; HF can be set to either Constant (on the entire weld), Start-Only (on for only the beginning of the weld), or off. To turn HF off, hold F3 for 3 seconds. HF is particularly useful for arc starts to reduce tungsten contamination, since it is not required to touch the work piece while HF is on. Default setting for DC is START ONLY. Default setting for AC is CONTINUOUS	**STICK:** **Hot Start** increases amperage when initiating the weld to prevent sticking. **Arc Force** changes the arc characteristics from soft to hard, which affects penetration and bead profile.
	• PEDAL/REMOTE • PANEL/LOCAL		Activates Remote (foot pedal) or Local (panel) control. While in Pedal/Remote, the foot pedal controls the amperage. In Panel/Local, the user programs amperage ramps and crater fill. A trigger torch or standard torch can be used in this setting. Local is beneficial for lift arc techniques as it provides more amperage-related functionality. Note: Default setting for STICK is Local. Function available only for TIG welding.	
	• PULSE ON • PULSE OFF **NOTE:** TIG functions only. Not available in STICK.		Pulsing means the output amperage cycles between Base Current and Main Current to provide more heat control. Pulsing affects the bead profile and pattern. Use MENU to step through PULSE options: • **BASE CURRENT** – changes the Base Current value. Typically, Base Current is set to half of Main Current. • **PPS** – changes how often amperage switches between Base Current and Main Current per second. A higher PPS setting creates focused puddle and tight ripple bead pattern. A lower PPS creates broader puddle and unique ripple bead pattern. • **% ON AT MAIN CURRENT** – changes the amount of time the pulse stays on at Main Current.	

FUNCTION SELECTION	BASIC FUNCTION DESCRIPTIONS	ADVANCED FUNCTION DETAILS	
	• FREQUENCY • BALANCE **NOTE:** AC function only	**FREQUENCY:** Normal AC frequency from the wall outlet is 60 Hz, which is the number of times the current alternates between DCEN and DCEP in one second. A higher frequency (90-240 Hz) focuses the arc. A lower frequency (40-90 Hz) softens the arc.	**BALANCE:** Normal AC frequency spends 50% of the time in DCEN and 50% of the time in DCEP. Adjusting the Balance determines how long the polarity stays in DCEN. A higher percentage of DCEN (60-80%) creates a tighter arc, less cleaning, and reduces tungsten balling. A lower percentage of DCEN (40-60%) creates a less-focused arc, more cleaning, and will likely create a ball on the top of the tungsten.
	• **MENU** = Step through parameters to make adjustments • **SAVING PROGRAMS** = There are three steps to saving a program: 1) Hold F7 for 3 seconds and all the LEDs will light up 2) Select the U# you would like to save to 3) Select F7 to save parameter changes made to program (only for U1-U20)	Use MENU to adjust parameters; Use PROGRAM to save your adjustments in your User Defined programs only. You cannot save your adjustments in Default programs (S1-S10; A1-A10).	

Parameter Setup

TIP: Start in the top-left corner at F1 and continue down and over through F7 to setup weld parameters. Once parameter is selected, use the dial to fine-tune settings. Pressing F7 steps through parameters; Holding F7 for 3 seconds saves changes made to parameters for User Defined Programs only.

TIG DC SETUP	TIG AC SETUP	STICK SETUP
		
		 NO ACTION REQUIRED - DEFAULT SETTING IS DC
 TIG-HF CONSTANT  TIG-HF START ONLY  TIG-HF OFF	 TIG-HF CONSTANT  TIG-HF START ONLY  TIG-HF OFF	 HOT START  ARC FORCE
 FOOT PEDAL  PANEL	 FOOT PEDAL  PANEL	 NO ACTION REQUIRED - DEFAULT SETTING IS PANEL
 USE MENU (F7) TO STEP THROUGH PULSE OPTIONS	 USE MENU (F7) TO STEP THROUGH PULSE OPTIONS	
 NO LED (AC FUNCTIONS NOT AVAILABLE IN DC TIG)	 USE DIAL TO ADJUST FREQUENCY  USE DIAL TO ADJUST BALANCE	
 STEP THROUGH PARAMETERS TO MAKE ADJUSTMENTS  SAVES PARAMETER CHANGES TO USER PROGRAMS ONLY	 STEP THROUGH PARAMETERS TO MAKE ADJUSTMENTS  SAVES PARAMETER CHANGES TO USER PROGRAMS ONLY	

Tungsten Recommendations

TUNGSTEN RECOMMENDATIONS	
TUNGSTEN TYPE	COMMENTS
1.5-2% Lanthanated (La)	Most versatile tungsten (best overall)
1.5-2% Ceriated (Ce)	Solid performance for most applications
1-2% Thoriated (Th)	Performance OK but hazardous
Pure	OK but will ball up and not allow concentrated arc

Recommended Amperage Settings for SMAW (Arc) Electrodes

SIZE OF WELDING ELECTRODE	AMPERAGE SETTING
1/16" – 16 Gauge	30-40
5/64" – 14 Gauge	50-65
3/32"	70-100
1/8″	100-140
5/32″	140-180
3/16″	150-200

Recommended Amperage & Electrode Types for TIG Welding

TUNGSTEN Ø	DCEN (Th, La, Ce)	AC (La, Ce)	AC (Pure)
.040″	10-50A	20-40A	N/A
1/16″	40-120A	30-170A	30-90A
3/32"	90-200A	60-180A	40-120A
1/8″	150A+	130A+	100-200A

Default Programs

The 220 TIG AC/DC is loaded with 20 Default Programs and 20 User Defined Programs for TIG welding. Default programs S1 through S5 are for welding steel without pulse control. S6 through S10 are for welding stainless steel with pulse control. A1 through A10 are for welding aluminum. User Defined programs are designated as U1 through U20. Default programs can be modified but cannot be saved. Recommended parameter settings for each Default Program is described in the chart below:

PROGRAM NAME	DESCRIPTION	RECOMMENDED TUNGSTEN	MATERIAL THICKNESS	MAIN CURRENT	BASE CURRENT	AC/ DC	PULSE (PPS)	PULSE	HF	PRE- & POST-FLOW TIME	FREQUENCY (% DCEN)	BALANCE (% DCEN)	CONTROL
S1	Steel Sheet	Th, La, Ce	1/16"	70		DC			Start only	.5/4			Remote (Foot Pedal)
S2	Steel Thin	Th, La, Ce	1/8"	110		DC			Start only	.5/5			Remote (Foot Pedal)
S3	Steel Thick	Th, La, Ce	1/4"	190		DC			Start only	.5/6			Remote (Foot Pedal)
S4	Steel Thin (Lift Arc)	Th, La, Ce	1/8"	80		DC			Start only	.5/4			Panel (Lift Arc)
S5	Steel Lift (Lift Arc)	Th, La, Ce	1/4"	150		DC			Start only	.5/6			Panel (Lift Arc)
S6	SS Sheet (Pulse)	Th, La, Ce	1/16"	60	30	DC	250	50	Start only	.5/3			Remote (Foot Pedal)
S7	SS Thin (Pulse)	Th, La, Ce	1/8"	100	50	DC	250	50	Start only	.5/5			Remote (Foot Pedal)
S8	SS Thick (Pulse)	Th, La, Ce	1/4"	180	90	DC	250	50	Start only	.5/7			Remote (Foot Pedal)
S9	SS Lift Arc Thin (Pulse)	Th, La, Ce	1/8"	100	50	DC	250	50	Start only	.5/5			Panel (Lift Arc)
S10	SS Lift Arc Thick (Pulse)	Th, La, Ce	1/4"	180	90	DC	250	50	Start only	.5/7			Panel (Lift Arc)
A1	Aluminum Sheet	La, Ce, P	1/16"	80		AC			Continuous	1.0/4	90	65	Remote (Foot Pedal)
A2	Aluminum Thin	La, Ce, P	1/8"	120		AC			Continuous	1.0/5	90	65	Remote (Foot Pedal)
A3	Aluminum Thick	La, Ce, P	1/4"	200		AC			Continuous	1.0/8	90	65	Remote (Foot Pedal)
A4	Aluminum Thin (Pulse)	La, Ce, P	1/8'	120	30	AC	1	50	Continuous	1.0/6	90	65	Remote (Foot Pedal)
A5	Aluminum Thick (Pulse)	La, Ce, P	1/4"	200	50	AC	1	50	Continuous	1.0/8	90	65	Remote (Foot Pedal)
A6	Aluminum (Better Penetration)	La, Ce, P	3/16"	150		AC			Continuous	1.0/7	90	75	Remote (Foot Pedal)
A7	Aluminum (Better Cleaning)	La, Ce, P	3/16"	150		AC			Continuous	1.0/7	90	50	Remote (Foot Pedal)
A8	Aluminum (Tight Arc)	La, Ce, P	3/16"	150		AC			Continuous	1.0/7	240	75	Remote (Foot Pedal)
A9	Aluminum (Board Arc)	La, Ce, P	3/16"	150		AC			Continuous	1.0/7	60	45	Remote (Foot Pedal)
A10	Aluminum (Lift Arc)	La, Ce, P	3/16"	150*		AC			Continuous	1.0/7	90	65	Panel (Lift Arc)

NOTE: User Defined programs: U1-U20

Maintenance & Servicing

General Maintenance

Your arc welder is simple and durable, requiring virtually no maintenance other than the guidelines shown below:

- Keep the ventilation holes clean to avoid the build-up of dirt inside the machine, this can reduce machine output.
- Check all cables periodically; they must be in good condition and not cracked.
- Always try to avoid getting particles of metal inside the machine since they could cause short circuits.
- Periodically clean the inside of the welder with compressed air.

Troubleshooting

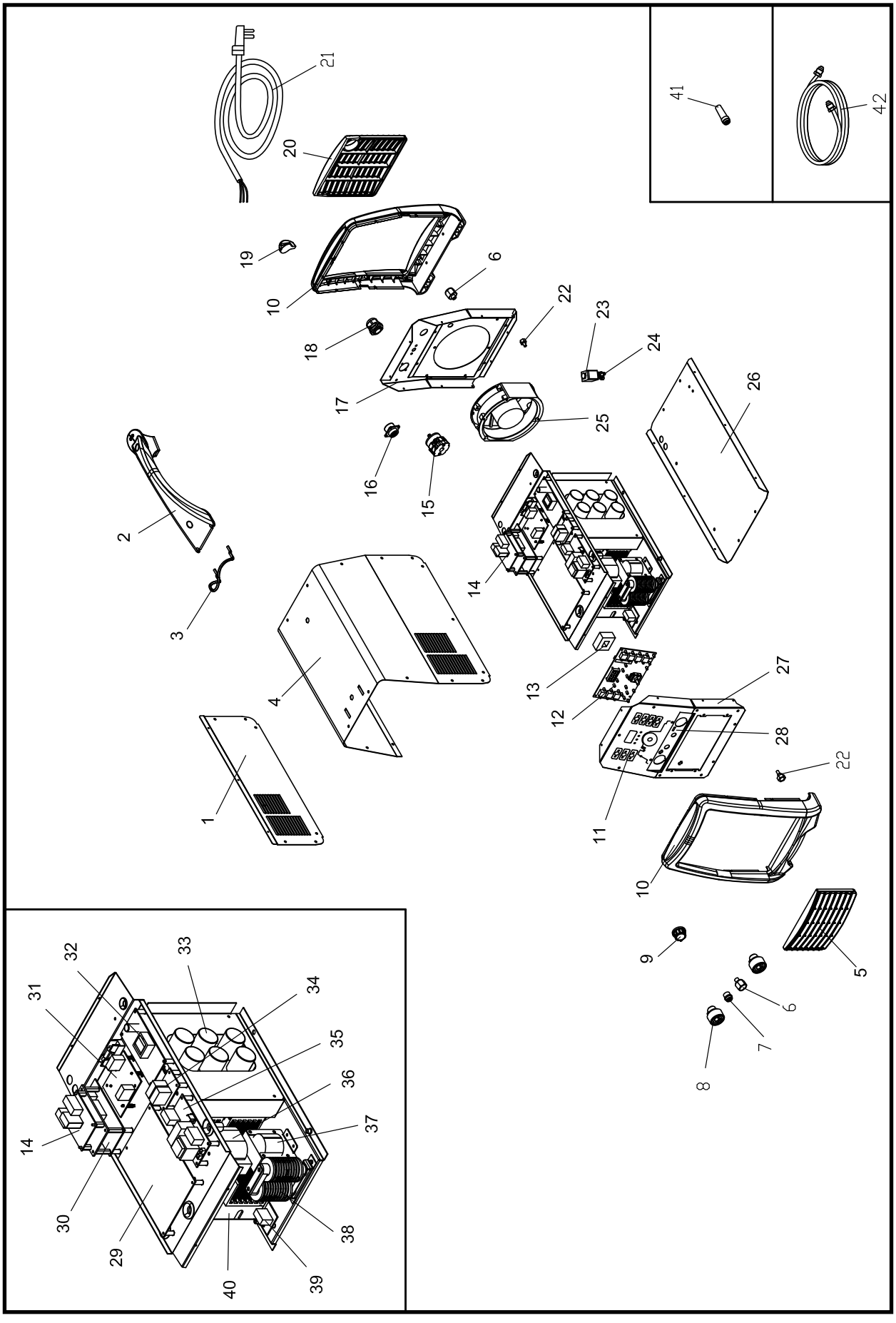
This chart will assist you in resolving common problems you may encounter. These are not all the possible solutions.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Temperature LED Indicator is on	Poor ventilation can cause over-heating Ambient temperature is too high Using over the rated duty-cycle	Improve the ventilation It will automatically recover when the temperature decreases
The adjustment knob on the front panel didn't work	Potentiometer broken (current regulation)	Replace the potentiometer.
Cooling Fan not working or turning very slowly	Switch broken Fan broken Wire broken or falling off	Replace the switch Replace or repair the fan Check the connection
No no-load voltage	Over voltage, under voltage or scarcity of phase Welder getting overheated Switch broken	See "Yellow Indicator is on" Replace the switch
Electrode Holder and Cable getting hot; "+" "-" polarity sockets becoming hot	Electrode holder's capacity is too small Cable is too small Socket loosen Increased resistance between the electrode holder and the cable	Replace it with a bigger capacity one Replace it with another one in conformity with the requirement Remove the oxide skin and tighten it
Power source tripping	Resume power over a long period of time (more than two days) In the process of welding	Trip caused by the main power filter's capacity charging. Switch on the main power source. Contact us
Others		Contact us

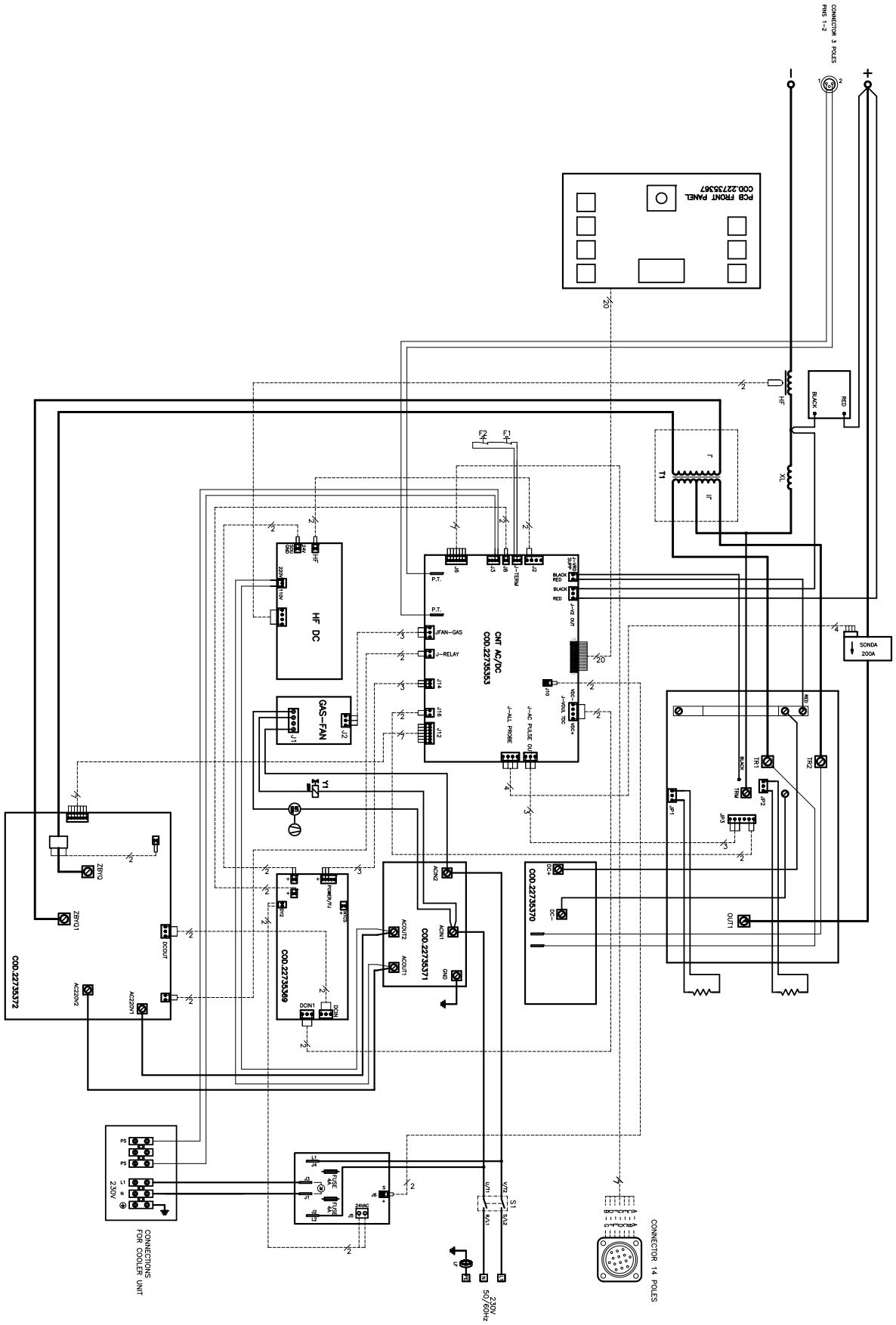
Parts List

REF. #	PART #	ITEM DESCRIPTION	QTY.
01	33705756 376C	SMALL LEFT SIDE PANEL	1
02	84004	HANDLE FOR TORCH WRAPPER	1
03	84003	TORCH WRAPPER	1
04	05000304	COVER	1
05	85703	FRONT LOUVERS	1
06	22910110	FEMALE GAS CONNECTOR 1/8"GAS - 5/8"UNF	1
07	85704	3 PIN FEMALE CONNECTOR	1
08	84071	50SQMM.DINSE SOCKET TBE35-50 CX58 1PC P.	1
09	85705	KNOB D. 33	1
10	85706	ASSEMBLY FRAME + CAPS	1
11	85707	FRONT PANEL LABEL	1
12	85708	FRONT PANEL PCB FOR 200AC/DC	1
13	85537	HALL PROBE YNC-200A	1
14	22735396	INTERFACE PCB FOR WATERCOOLING UNIT	1
15	85709	ROTARY SWITCH CA2602	1
16	40211456	CONNECTION WIRES FOR 14 POLE CONNECTOR	1
17	05000303	BACK PANEL WITH SILK SCREEN	1
18	21605040K	SWITCH D.20	2
19	85575	SWITCH KNOB D.38 BLACK 1-PC	1
20	85711	REAR LOUVERS <=710	1
21	84066	POWER CORD ST 3X12AWG 4.6M W/6-50P PLUG	1
22	22910096	PLASTIC GROMMET D.6 - 1/8" FEMALE	1
23	85542	SOLENOID VALVE 11VA 230V 60HZ 1-PC PACK	1
24	22910004K	HOSE TAIL D.6 1/8"M 1-PC PACK	1
25	85712	FAN RAH1751B1-C 230V AC 172X150X51	1
26	05000291	BOTTOM PANEL	1
27	05000302	FRONT PANEL	1
28	84058	LABEL GAS-CABLE CONNECTION	1
29	85713	CONTROL PCB FORNEY 220 TIG AC/DC	1
30	85714	SECONDARY POWER PCB 220 TIG AC/DC	1
31	85715	INPUT FILTER PCB FOR 220 TIG AC/DC	1
32	85716	SWITCHING PCB 220 TIG AC/DC	1
33	85717	PRIMARY PCB + HEATSINK ASSEMBLY 220 TIG AC/DC	1
34	85718	RELAY/FAN POWER PCB FOR 220 TIG AC/DC	1
35	85719	HF POWER OCB FOR 220 TIG AC/DC	1
36	84087	TRANSFORMER FOR 220 TIG AC/DC	1
37	84082	CHOKE FOR 220 TIG AC/DC	1
38	84083	HF CHOKE FOR 220 TIG AC/DC	1
39	85720	HF FILTER PCB FOR 220 TIG AC/DC	1
40	85721	SECOND. PCB + HEATSINK ASSEMBLY 220 TIG AC/DC	1
41	84072	3 PIN MALE CONNECTOR	1
42	30900036	BLACK GAS HOSE 4,6 METER	1

Parts Diagram



Wiring Diagram



User Notes

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