

RAMSOND[®]

INSTRUCTION MANUAL

**Digital Inverter Multifunction
Welder/Cutter**

3-in-1 CT Series

MODELS: CT416 and CT 518

D and DX Series

Serial No. _____

IMPORTANT

BEFORE STARTING THE EQUIPMENT, READ THE CONTENTS OF THIS MANUAL, WHICH MUST BE STORED IN A PLACE FAMILIAR TO ALL USERS FOR THE ENTIRE OPERATIVE LIFE-SPAN OF THE MACHINE. THIS EQUIPMENT MUST BE USED SOLELY FOR WELDING/PLASMA CUTTING OPERATIONS.



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WARNING

THIS MACHINE PRODUCES HIGH TEMPERATURE ARCS, FLAMES, SPARKS AND HIGH CURRENT ELECTRICAL POWER. FAILURE TO ADHERE WITH THE SAFETY WARNINGS, INSTRUCTIONS AND RECOMMENDATIONS CONTAINED HEREIN MAY RESULT IN THE RISK OF FIRE, PROPERTY, DAMAGE, SERIOUS INJURY, ELECTROCUTION AND DEATH.

IMPORTANT



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SAFETY PRECAUTIONS

WELDING AND ARC CUTTING CAN BE HARMFUL TO YOURSELF AND OTHERS

The user must therefore be educated against the hazards, summarized below, deriving from welding/cutting operations.

ELECTRIC SHOCK - May be fatal.



- Install and earth the welding/cutting machine according to the applicable regulations.
- Do not touch live electrical parts or electrodes with bare skin, gloves or wet clothing.
- Isolate yourselves from both the earth and the workpiece.
- Make sure your working position is safe.
- Prior to performing maintenance make sure the unit is disconnected from the power source.

FUMES AND GASES - May be hazardous to your health.



- Keep your head away from fumes.
- Work in the presence of adequate ventilation, and use ventilators around the arc to prevent gases from forming in the work area.
- Do not breathe in the fumes. Use proper ventilators and masks.

ARC RAYS - May injure the eyes and burn the skin.



- Protect your eyes with welding masks fitted with filtered lenses, and protect your body with appropriate safety garments.
- Protect others by installing adequate shields or curtains.

RISK OF FIRE AND BURNS



Sparks (sprays) may cause fires and burn the skin; you should therefore make sure there are no flammable materials in the area, and wear appropriate protective garments.

NOISE



This machine does not directly produce noise exceeding 80dB. The plasma cutting/welding procedure may produce noise levels beyond said limit; users must therefore implement all precautions required by law.

PACEMAKERS



The magnetic fields created by high currents may affect the operation of pacemakers. Wearers of vital electronic equipment (pacemakers) should consult their physician before beginning any arc welding, cutting, gouging or spot welding operations.

EXPLOSIONS



Do not weld/cut in the vicinity of containers under pressure, or in the presence of explosive dust, gases or fumes. ·All cylinders and pressure regulators used in welding operations should be handled with care.

MISUSE **LIMITED WARRANTY VOID**

IMPORTANT



Your CT series unit is equipped with three different functions. Please take note of the following operational guidelines. Failure to adhere to the following operations guidelines will cause severe damage to your machine and will render the Limited Warranty void. The following is not meant to be an all inclusive list of situations where the Limited Warranty is rendered void. It is meant to serve as an example. Please review the remainder of this manual and the terms of Limited Warranty supplied herein for further details.

OPERATE ONLY ONE FUNCTION AT A TIME

Using multiple functions simultaneously will lead to severe damage to the unit and render the warranty void.

DO NOT SWITCH BETWEEN FUNCTIONS DURING OPERATION

While engaged in operating one of the functions, do not switch to another function. For example, if you are engaged in plasma cutting, do not change the toggle switch of the Function Selector to TIG or MMA.

CONFIRM CORRECT SETTING BEFORE OPERATION

Confirm that the function selector is set to the proper setting before beginning operation. For example, do not attempt to use the plasma torch function while the machine's Function Selector is on TIG. This will lead to serious damage to the unit.

DO NOT USE PLASMA TORCH IN MMA OR TIG MODE

Using the plasma torch while the machine is switched to the MMA or TIG function will result in damage to the plasma torch and the CT machine.

INCORRECT WIRING

Failure to connect the CT unit correctly to the main input power source will result in severe damage to the unit and may lead to the risk of injury, death or electrocution. Please follow the wiring diagram supplied with your machine.

INTRODUCTION TO RAMSOND CT Series

Ramsond CT series is a multi-functional welder/plasma cutter made with advanced inverter technology. The CT series has three functions: TIG/MMA/CUT. They are dual voltage (110 and 220 V) and can operate with both 50 and 60 Hz frequencies. The inverter power is the power that first changes 50/60 Hz working frequency to high frequency (as high as 100 Hz) with high power factor V-MOS, and then reduces the voltage and rectifies through PWM (Pulse Width Modulation), creating high factor welding and cutting power. By using the inverter technology, the weight and volume of the mains transformer has been greatly reduced as compared with conventional machines, while the efficiency has been raised by over 30%. When working as MMA or TIG, the outer characteristic of the RAMSOND CT series is constant current and the welding current doesn't change with the length of the arc. In this case current is very stable. When working in plasma cut mode, the arc is compressed by the rapid-circulating air, and then its temperature reaches 10000 ~ 15000 degrees in the state of ionization, thus turning into strong plasma arc. Ramsond CT series units can be widely used in welding and cutting carbon steel, stainless steel, alloy steel, copper and other nonferrous metals. They are portable, efficient, energy-saving and stable.

INSTALLATION POWER SUPPLY WIRING DIAGRAM

DIAGRAM #1

RAMSOND®

Ramsond Power Technology Group LLC

WIRING DIAGRAM FOR RAMSOND CUT, CT AND SUPER SERIES WELDER/PLASMA CUTTERS

110 V Wiring Diagram

220 V Wiring Diagram



POWER CABLE



 Red = Positive

 Blue = Negative

 2 Tone = Ground

 Red = Positive

 Blue = Positive

 2 Tone = Ground

CAUTION

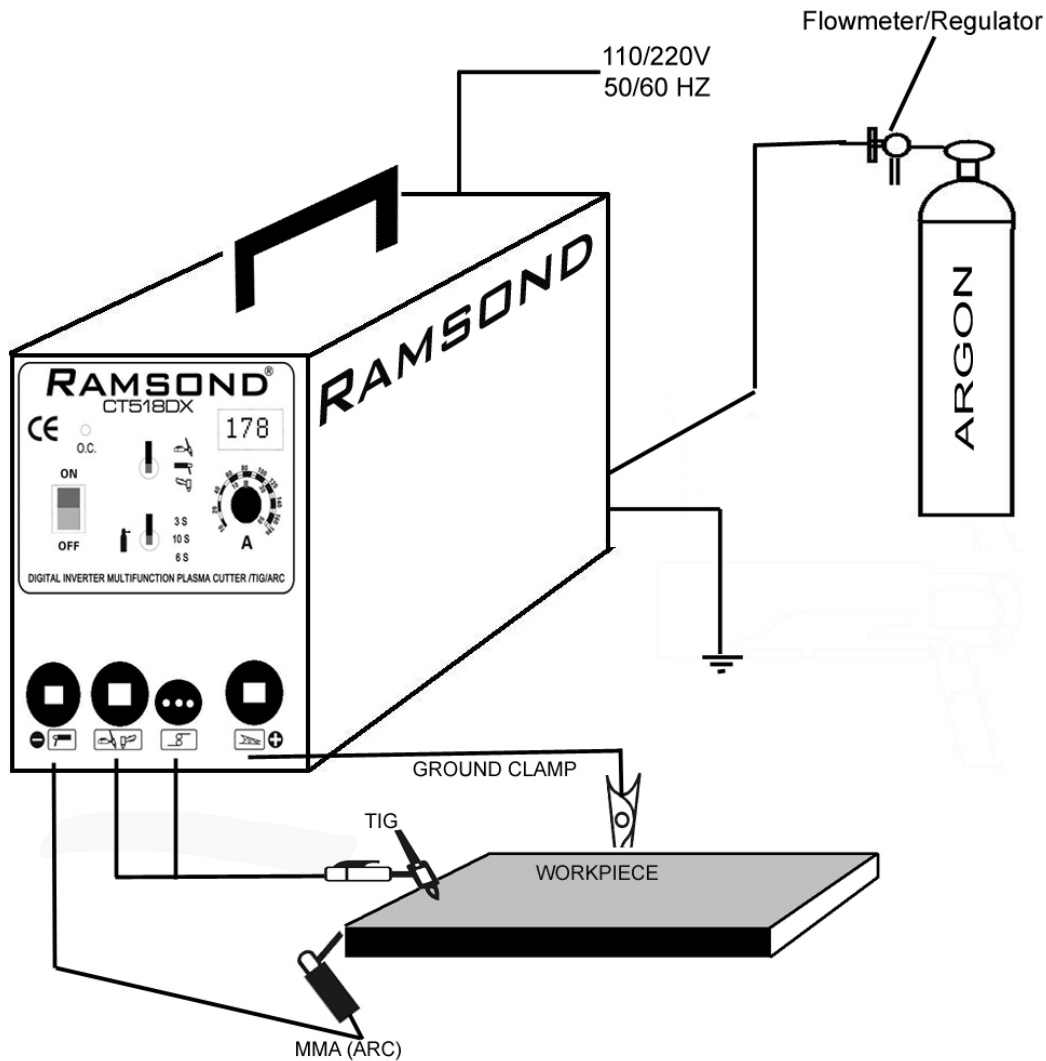
Incorrect wiring may lead to risk of injury and severe damage to the unit. It shall also render the limited warranty void.

IMPORTANT WARRANTY INFORMATION

IMPROPER WIRING OF THE UNIT WILL LEAD TO SUBSTANTIAL DAMAGE TO THE UNIT AND WILL RENDER THE WARRANTY VOID.

CONNECTION DIAGRAM (TIG and MMA FUNCTION)

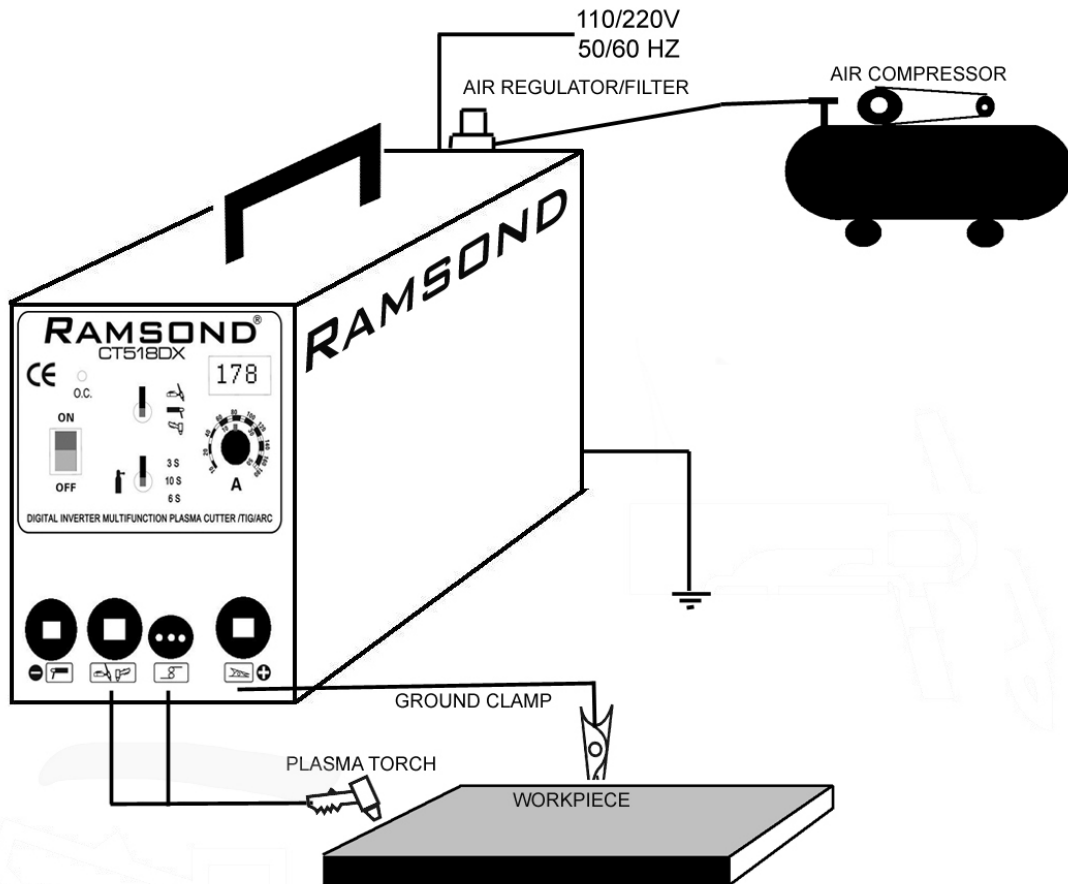
DIAGRAM #2



ENSURE THE PROPER GROUNDING OF THE CUTTING SURFACE. IF THE WELDING SURFACE IS NOT PROPERLY GROUNDED, YOU WILL NOT GET ADEQUATE ARC. DEBRIS, RUST AND OTHER PARTICLES MUST BE REMOVED TO ENSURE PROPER GROUNDING OF THE WORK SURFACE.

CONNECTION DIAGRAM (PLASMA CUT FUNCTION)

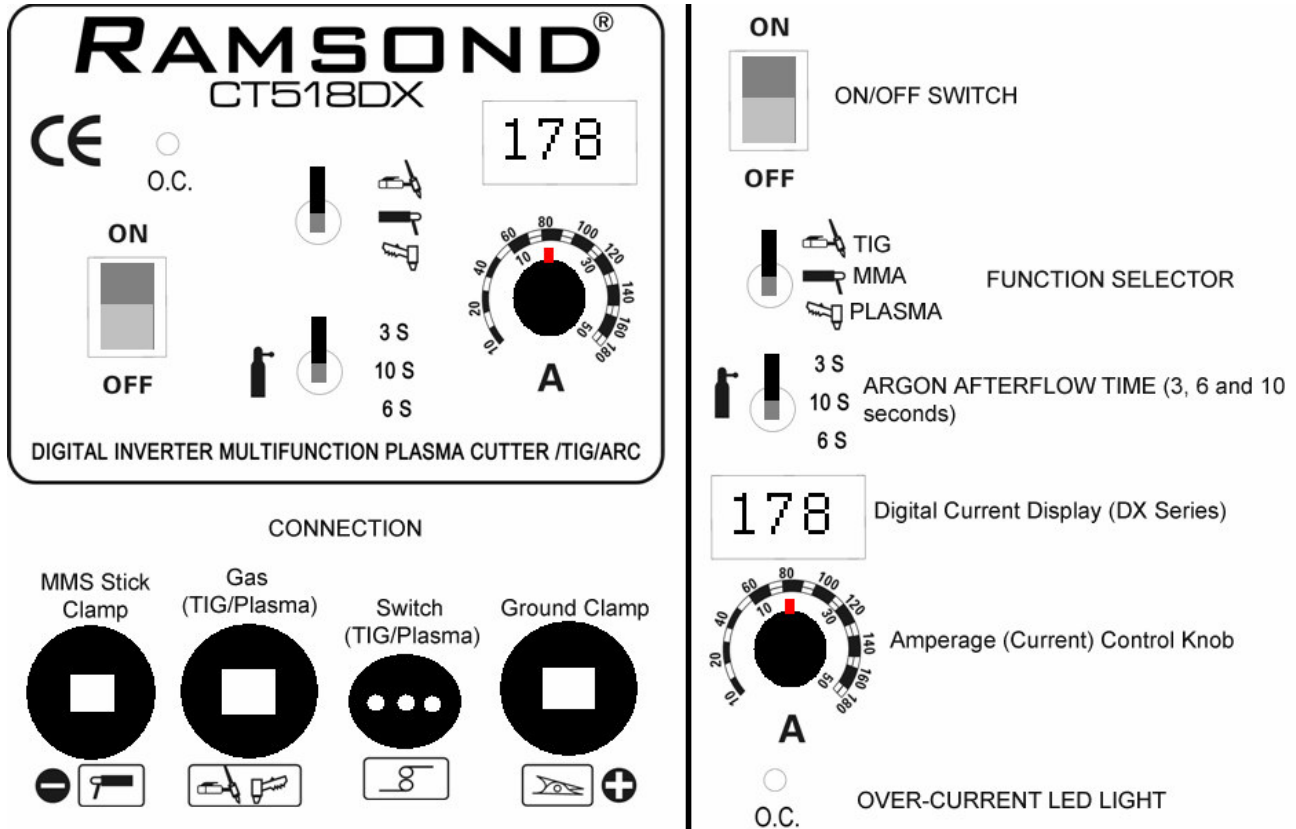
DIAGRAM #3



ENSURE THE PROPER GROUNDING OF THE CUTTING SURFACE. IF THE CUTTING SURFACE IS NOT PROPERLY GROUNDED, YOU WILL NOT GET ADEQUATE ARC. DEBRIS, RUST AND OTHER PARTICLES MUST BE REMOVED TO ENSURE PROPER GROUNDING OF THE CUTTING SURFACE.

FRONT PANEL DIAGRAM

DIAGRAM #4

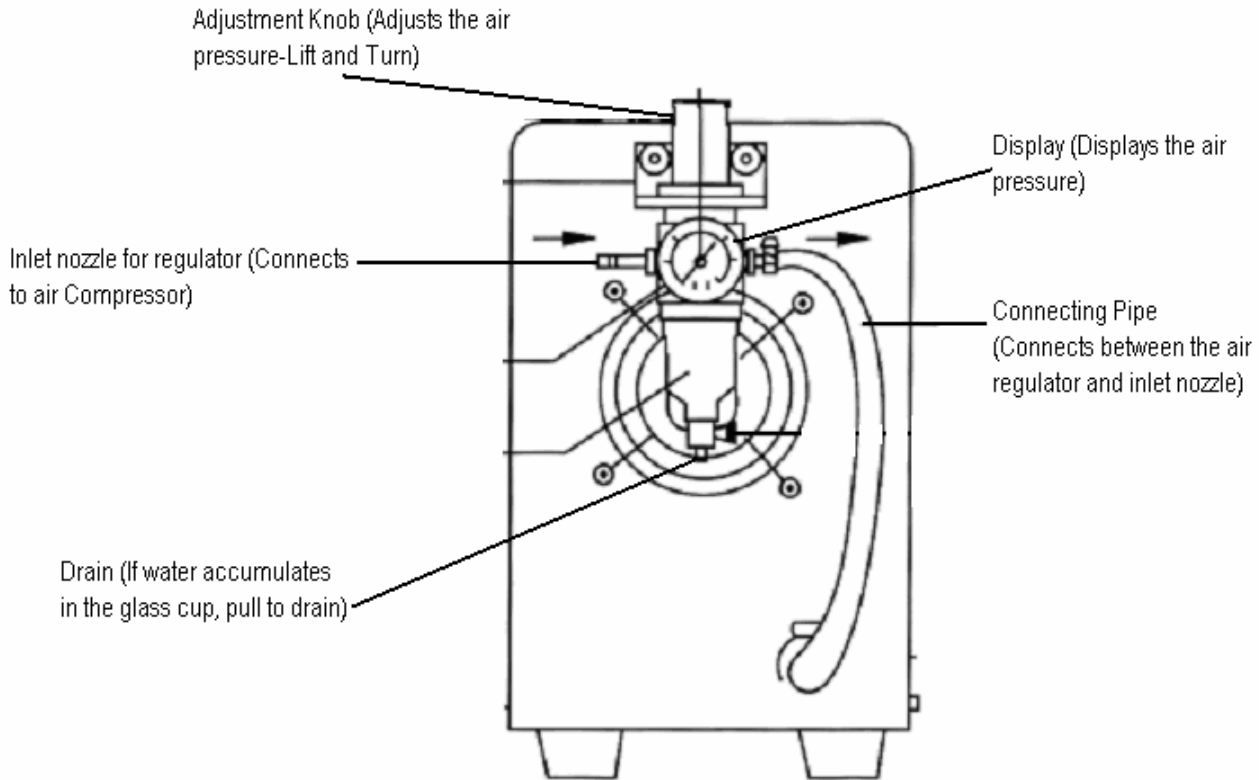


NOTES ON DX SERIES

DX Series – Equipped with Digital Amperage Display

1. The digital display panel may remain lit for a period of up to 1 minute after turning off the unit. This is normal.
2. The digital display of Amperage may display a value that exceeds or fall short of the maximum/minimum performance parameters of the unit. This is normal within a 5-10% range.
3. The digital display of Amperage may fluctuate during operation. This is normal.
4. The AMP level on the digital display may not correspond with the printed AMP level on the panel. This is normal. In case of discrepancy, rely on the digital display.
5. Fluctuations of digital display during operation are considered normal.

DIAGRAM #4 REAR AIR CONNECTION DIAGRAM



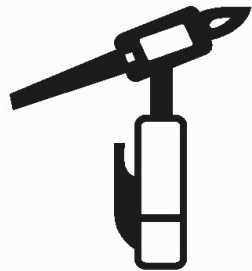
Connecting the Air/Gas Supply

Your Ramsond CT must be supplied with clean air with sufficient pressure and Argon gas (for TIG) to operate. Never operate your machine's TIG and Plasma function without compressed air/gas. A multifunction air regulator/filter and an argon gas flow meter have been supplied with your machine.

The air filter/regulator connects to the back of your machine. The two bolts on top are of the machine connect to the bracket supplied with your air regulator/filter. There is also a rubber hose and tightening clamps provided which connects between the air regulator/filter and "gas in" nozzle of your machine. The filter/regulator is equipped with an adjustment knob on top to control the air pressure. The display dial will change according to your desired pressure. In the event of water accumulation in the glass cup, pull the nozzle on the bottom to drain the water.

The argon flow meter will connect to the argon tank.

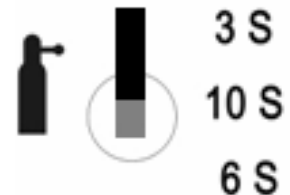
TIG FUNCTION OPERATION



1. Ensure proper connection before you begin. See Diagram 2.
2. Turn on the power Switch.
3. Move the toggle switch of the function selector to the TIG Position

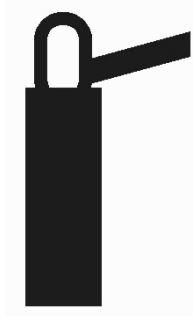


4. Select an appropriate AFTER-FLOW Time. After-flow is a function that maintains a flow of argon for a period of (3, 6 or 10 seconds) after you stop welding. So, even after you let go of the torch switch argon will flow from the torch for the designated period. This function serves to protect the welding spot prior to cooling. So, it is important to keep torch at the welding spot for the designated time after the welding has finished.



5. Set a desired welding current according to the thickness of the work piece and the technical requirements.
6. Push down the torch button. At this time you should hear the HF arc. The argon gas will also begin to flow at this time. Please let the argon flow through the torch for a few seconds to allow the air to exit the torch pipe and system.
7. Bring the tungsten to a distance of 1-4mm from the work piece. Push the control button of the torch which will generate HF arc between the electrode and the work piece. This arc will disappear soon after it appears, then you can begin TIG welding.

MMA ARC (STICK WELD) FUNCTION OPERATION



1. Ensure proper connection before you begin. See Diagram 2.

2. Turn on the power Switch.

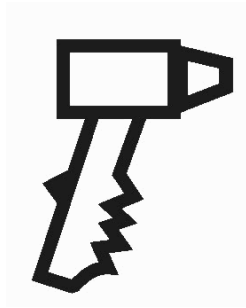
3. Move the toggle switch of the function selector to the MMA position.



4. Set a desired welding current according to the thickness of the work piece, the rod, and the technical requirements.

5. Begin to weld

PLASMA CUT FUNCTION



1. Ensure proper connection before you begin. See Diagram 3.
2. Turn on the power Switch.
3. Move the toggle switch of the function selector to plasma cut position.
4. Set a desired current according to the thickness of the work piece and its material.
5. Turn on the air regulator and achieve a minimum 30 psi air pressure.
6. Push down the torch button. At this time you should hear the HF arc. The compressed air will also begin to flow at this time.
7. Bring the tip of the torch close to the work piece (sometimes it is necessary to touch the work piece) and you will achieve plasma arc you can begin your work now. After the arc-starting, keep the nozzle and work piece about 1mm from each other, which is good for protecting the nozzle and consumables.



IMPORTANT

BEFORE TURNING YOUR UNIT ON OR OFF MAKE SURE THE AMP REGULATION IS SET TO THE MINIMUM SETTING. FAILURE TO DO SO MAY LEAD TO DAMAGE TO THE UNIT.

OPERATION

A. To Begin

Turn the Power Switch to the ON position.

Position yourself to where you can read the air pressure. Press the torch switch (air will exhaust from torch, adjust the air regulator to read approximately 30 to 70 pounds (PSI) and release to switch.

Note: The Air pressure has a generally acceptable range of 50 to 80 PSI. You may experiment as desired... but be careful not to lower the pressure too much as consumable damage will occur.

Secure ground clamp to workpiece. Connect clamp to main part of workpiece, not the part being removed.

B. Cutting

1. DRAG CUTTING

Position torch tip slightly above workpiece, press torch switch and lower torch tip toward workpiece until contact is made and cutting arc is established. After cutting arc is established, move the torch in the desired direction keeping the torch tip slightly angled, maintaining contact with the workpiece.

This methodology is called Drag-Cutting. Avoid moving too fast as would be indicated by sparks radiating from the top side of workpiece. Move the torch just fast enough to maintain sparks concentration at the underside

of the work-piece and making sure the material is completely cut through before moving on. Adjust drag speed as desired/required.

3. Stand-off Cutting

In some cases, it may be beneficial to cut with the torch tip raised above the work-piece approximately 1/16" to 1/8" to reduce material blow-back into the tip and to maximize penetration of thick material cuts. An example of "stand-off cutting" would be used when penetration cutting or gouging operation is being performed. You can also use "stand-off" technique when cutting sheet metal to reduce the chance of splatter-back tip damage.

4. Piercing

For piercing, position the tip approximately 1/8" (3.2 mm) above the workpiece. Angle the torch slightly to direct sparks away from the torch tip and operator.

Initiate the pilot arc and lower the tip of the torch until the main cutting arc transfers, sparks start.

Start the pierce off the cutting line on the scrap piece or template and then continue the cut onto the cutting line.

Hold the torch perpendicular to the workpiece after the pierce is complete and continue cutting as desired.

Clean spatter and scale from the shield cup and the tip as soon as possible.

BASIC PRINCIPLES AND TERMINOLOGY OF PLASMA CUTTING

PLASMA

A. Plasma Defined

Plasma cutters work by sending a pressurized gas, such as air, through a small channel. In the center of this channel, you'll find a negatively charged electrode. The electrode is at the center, and the nozzle is just below it. The swirling causes the plasma to turn rapidly as it passes. When you apply power to the negative electrode, and you touch the tip of the nozzle to the metal, the connection creates a circuit. A powerful spark is generated between the electrode and the metal. As the inert gas passes through the channel, the spark heats the gas until it reaches the fourth state of matter. This reaction creates a stream of directed plasma, approximately 30,000 F (16,649 C) or more and moving at 20,000 feet per second (6,096 m/sec), that reduces metal to vapor and molten slag.

The plasma itself conducts electrical current. The cycle of creating the arc is continuous as long as power is supplied to the electrode and the plasma stays in contact with the metal that is being cut. The cutter nozzle has a second set of channels. These channels release a constant flow of shielding gas around the cutting area. The pressure of this gas flow effectively controls the radius of the plasma beam. **NOTE! This machine is designed to use only compressed air as the "gas".**

B. Voltage Regulation

The Automatic Voltage Compensation circuit prevents voltage load from exceeding maximum in accordance with the main technical data sheet and shortening the life of the machine.

C. Thermal Protection

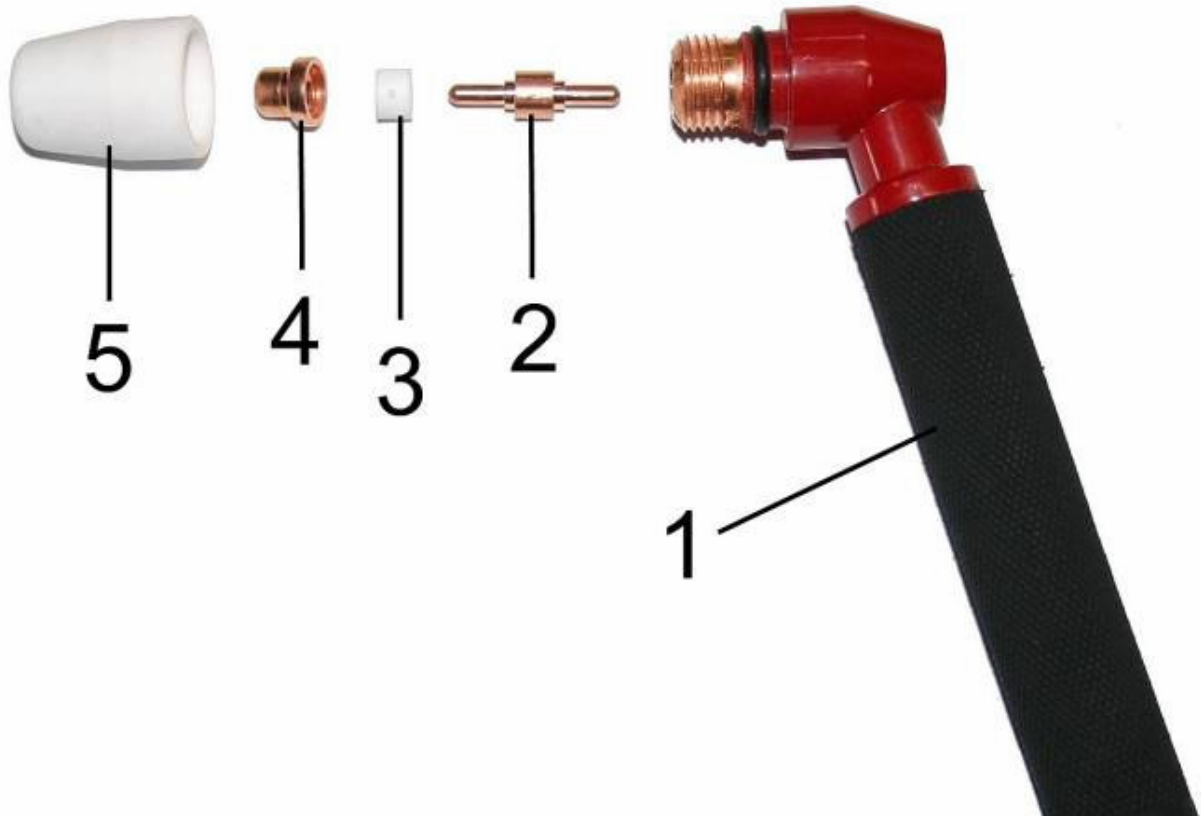
The thermal protection circuits will engage if unit exceeds duty cycle. This will cause the machine to stop working. The indicator will be lit on the front of the machine. The fan will most likely continue to run until unit cools down. When it reaches an acceptable temperature, it will operate again.

D. Duty Cycle

Duty cycle is the percentage of on time (measured in minutes) in a 10-minute period in which the machine can be operated continually, in an environment of a specified temperature.

Exceeding duty cycle ratings will cause the thermal overload protection circuit to become energized and shut down output until the unit cools to normal operating temperature. Continual exceeding of duty cycle ratings can cause damage to the machine.

PLASMA TORCH



- 1. TORCH BODY (CUT TORCH IS ALSO EQUIPPED WITH A HAND SWITCH)
- 2. REVERSIBLE ELECTRODE
- 3. SWIRL RING
- 4. TIP
- 5. CUP

WARNING

Before replacing the consumables of the torch make sure the machine is turned off and disconnected from the power source.

CONSUMABLES ARE AVAILABLE FOR PURCHASE AT www.RAMSOND.com.

TIG TORCH



1. TORCH BODY (CUT TORCH IS ALSO EQUIPPED WITH A HAND SWITCH)
2. Collet
3. Collet Body
4. Alumina Cup
5. Long Back Cap
6. Short Back Cap

WARNING

Before replacing the consumables of the torch make sure the machine is turned off and disconnected from the power source.

CONSUMABLES ARE AVAILABLE FOR PURCHASE AT www.RAMSOND.com.

OPERATING ENVIRONMENT

1. The Ramsond CT can perform in environments where conditions are particularly harsh and with outside temperature between -10 and +40 degree centigrade (-23 and 5 °F) with a humidity level of maximum 80%.
2. **DO NOT USE MACHINE IN WET/RAINING ENVIRONMENT**
3. **Keep machine dry and avoid entry of water into machine.**
4. **Do not use this machine in environment where air is polluted with high concentration of dust or corrosive gas.**

TROUBLESHOOTING

<u>SYMPTOM</u>	<u>CAUSE / SOLUTION</u>
No Torch Arc or Inadequate Arc	<ol style="list-style-type: none">1. Incorrect Wiring - Check Main's Wiring2. Power Switch off -Turn Machine on3. No main power4. Inadequate Air Supply - Minimum 30 psi needed5. Torch problem -change consumables and ensure proper assembly.6. Torch problem - There is short in the torch wire.7. Cutting surface not grounded and connected to the machine - make sure ground clamp is connected8. Cutting surface is rusty - clean the rust9. Lower the torch closer to cutting piece
O.C. (OVER CURRENT) Light is Lit	<ol style="list-style-type: none">1. Duty Cycle reached - Wait a few moments until the machine cools down.2. Internal component problem. See professional assistance

1 YEAR LIMITED WARRANTY

Ramsond Corporation warrants that this product is free from defect or workmanship for a period of 1 year from the date of purchase, subject to the limitations contained herein. In the event of product failure or malfunction, return this product in person or by courier to:

Ramsond Corporation
WPC Service Department
4051 Haggerty Road
West Bloomfield, Michigan 48323
Tel: (248) 363-8302
Fax: (248) 363-7834

You must include the following to receive warranty service:

1. Proof of purchase.
2. Description of the fault or problem
3. \$20 Handling fee (check, money order)
4. Return Shipping Label (prepaid) for returning the repaired/replaced product to the customer

The faulty/defective product component will then be repaired or replaced (at our option). The repaired/replaced component shall then be returned to the purchaser. The purchaser shall be responsible for all shipping and handling costs of sending the defective/faulty item to us, as well as all shipping and handling costs of returning the repaired/replaced to the customer. Any import/export costs, such as brokerage fees, taxes, customs or duties are the responsibility of the customer. Certain items which are subject to normal wear and tear are specifically excluded from this warranty (e.g. consumables, tips, etc). Please allow up to 30 days from date that we receive the unit for repair/replacement. In the event that we are not able to repair the product, we will replace the product with same or similar unit. In the event that the model is not available, we will replace the machine with an existing model with same or better characteristics and quality. We shall not be responsible for faulty installation, operation or maintenance of the product and as such we recommend installation, assembly, repair and maintenance only by certified and qualified professionals. We reserve the right to require proof of same before honoring any parts warranty replacement/repair. Damage resulting from failure to use the product in a manner consistent with our recommendations shall render the limited warranty void. This limited warranty specifically excludes any consequential and/or incidental damages. Although we may provide technical assistance via telephone or email to the customer, it is virtually impossible to troubleshoot all matters via telephone or remote assistance. As such, the offering by us of any technical assistance is made without any warranty or guarantee and provided on "as is" basis. It is the responsibility of each purchaser to determine whether any particular product is compliant with and permissible for use pursuant to the applicable rules, codes and/or regulations, if any, and suitable for particular use and operation. We make no representations or warranties whatsoever concerning the suitability of any merchandise for a particular use or purpose. The details, specification and information provided herein are the full and complete information and data available with respect to each product. Do not assume the existence of any fact, data or information that is not expressly stated herein. We only warrant the information contained herein. If you purchase under certain assumptions which are not expressly stated herein, you purchase at your own risk and without recourse to us. We reserve the right to make slight modifications necessary to the merchandise for product improvement. We may carry this product in colors other than the colors displayed herein. As such, we will ship according to color availability.