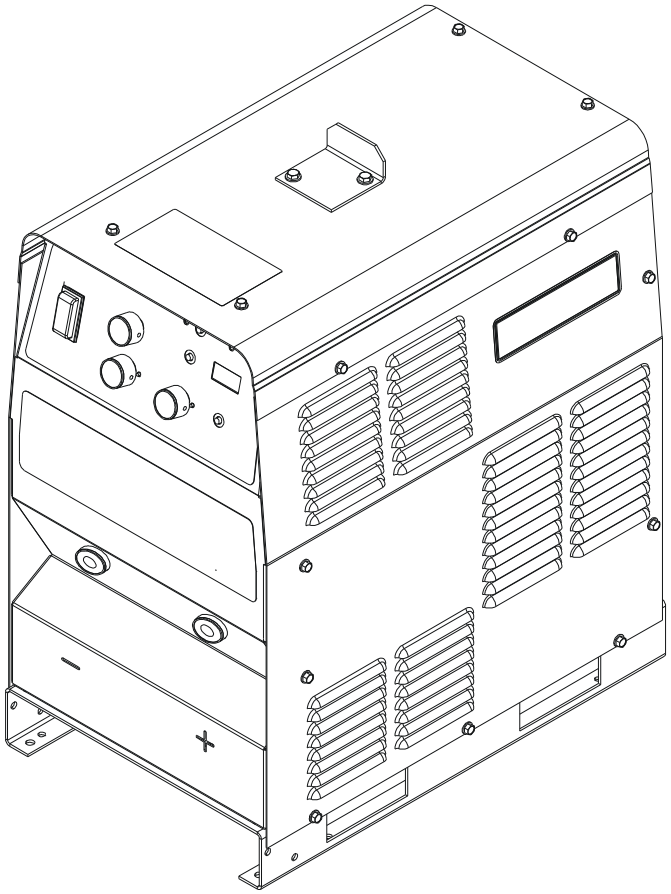
CIGWELD

OPERATING MANUAL



CC/CV POWER SOURCE

TRANSMIG 500i **Part No. 710020**

719467-04-O09

Manufacturer and Merchandiser of Quality Consumables and Equipment: CIGWELD

Address: 71 Gower St, Preston
Victoria 3072
Australia

Description of equipment: Welding Equipment (GMAW, MMAW, GTAW, CAG). CIGWELD TRANSMIG 500i and associated accessories.

* Serial numbers are unique with each individual piece of equipment and details description, parts used to manufacture a unit and date of manufacture.

* The equipment conforms to all applicable aspects and regulations of the 'Low Voltage Directive' (Directive 73/23/EU, as recently changed in Directive 93/63/EU and to the National legislation for the enforcement of the Directive.

National Standard and Technical Specifications

The product is designed and manufactured to a number of standards and technical requirements among them are:

* AS1966-1 applicable to welding equipment and associated accessories.

* AS/NZS 3652-(EMC Directive EN50199) applicable to arc welding equipment - generic emissions and regulations.

* EN60974-1 applicable to welding equipment and associated accessories.

* Extensive product design verification is conducted at the manufacturing facility as part of the routine design and manufacturing process, to ensure the product is safe and performs as specified. Rigorous testing is incorporated into the manufacturing process to ensure the manufactured product meets or exceeds all design specifications.

CIGWELD has been manufacturing and merchandising an extensive equipment range with superior performance, ultra safe operation and world class quality for more than 30 years and will continue to achieve excellence.

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1. Introduction

1.1 Notes, Cautions and Warnings

Throughout this manual, notes, cautions, and warnings are used to highlight important information. These highlights are categorized as follows:

NOTE

An operation, procedure, or background information which requires additional emphasis or is helpful in efficient operation of the system.

CAUTION

A procedure which, if not properly followed, may cause damage to the equipment.

WARNING

A procedure which, if not properly followed, may cause injury to the operator or others in the operating area.

1.2 Important Safety Precautions

WARNING

OPERATION AND MAINTENANCE OF WELDING ARC EQUIPMENT CAN BE DANGEROUS AND HAZARDOUS TO YOUR HEALTH.

To prevent possible injury, read, understand and follow all warnings, safety precautions and instructions before using the equipment. Call your local distributor if you have any questions.

GASES AND FUMES

Gases and fumes produced during the welding process can be dangerous and hazardous to your health.

- Keep all fumes and gases from the breathing area. Keep your head out of the welding fume plume.
- Use an air-supplied respirator if ventilation is not adequate to remove all fumes and gases.
- The kinds of fumes and gases from the welding arc depend on the kind of metal being used, coatings on the metal, and the different processes. You must be very careful when cutting or welding any metals which may contain one or more of the following:

Antimony	Beryllium	Cobalt	Manganese	Selenium
Arsenic	Cadmium	Copper	Mercury	Silver
Barium	Chromium	Lead	Nickel	Vanadium

- Always read the Material Safety Data Sheets (MSD's) that should be supplied with the material you are using. These MSDS's will give you the information regarding the kind and amount of fumes and gases that may be dangerous to your health.
- For information on how to test for fumes and gases in your workplace, refer to item 1 in Subsection 1.3, Publications in this manual.
- Use special equipment, such as water or down draft cutting tables, to capture fumes and gases.
- Do not use the welding torch in an area where combustible or explosive gases or materials are located.
- Phosgene, a toxic gas, is generated from the vapours of chlorinated solvents and cleansers. Remove all sources of these vapours.
- Refer to the Victorian Occupational Health and safety (Confined Spaces) Regulations 1996 and Code of Practice or its equivalent for other states and / or countries.

ELECTRIC SHOCK

Electric Shock can injure or kill. The welding arc process uses and produces high voltage electrical energy. This electric energy can cause severe or fatal shock to the operator or others in the workplace.

- Never touch any parts that are electrically "live" or "hot."
- Wear dry gloves and clothing. Insulate yourself from the work piece or other parts of the welding circuit.
- Repair or replace all worn or damaged parts.
- Extra care must be taken when the workplace is moist or damp.
- Disconnect power supply before performing any service or repairs.
- Install and maintain equipment according to NEC code, refer to item 4 in Subsection 1.3, Publications.
- Read and follow all the instructions in the Operating Manual.

FIRE AND EXPLOSION

Fire and explosion can be caused by hot slag, sparks, or the welding arc.

- Be sure there is no combustible or flammable material in the workplace. Any material that cannot be removed must be protected.
- Ventilate all flammable or explosive vapours from the workplace.
- Do not cut or weld on containers that may have held combustibles.
- Provide a fire watch when working in an area where fire hazards may exist.
- Hydrogen gas may be formed and trapped under aluminium work pieces when they are cut underwater or while using a water table. **DO NOT** cut aluminium alloys underwater or on a water table unless the hydrogen gas can be eliminated or dissipated. Trapped hydrogen gas that is ignited will cause an explosion.

NOISE

Noise can cause permanent hearing loss. Plasma arc processes can cause noise levels to 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. Protect others in the workplace.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.
- For information on how to test for noise, see item 1 in Subsection 1.3, Publications, in this manual.

ARC RAYS

Arc Rays can injure your eyes and burn your skin. The welding arc process produces very bright ultra violet and infra red light. These arc rays will damage your eyes and burn your skin if you are not properly protected.

- To protect your eyes, always wear a welding helmet or shield. Also always wear safety glasses with side shields, goggles or other protective eye wear.
- Never wear contact lenses whilst welding.
- Wear welding gloves and suitable clothing to protect your skin from the arc rays and sparks.
- Keep helmet and safety glasses in good condition. Replace lenses when cracked, chipped or dirty.
- Protect others in the work area from the arc rays. Use protective booths, screens or shields.
- Use the shade of lens as recommended in the Operating Manual.

1.3 Publications

Refer to the following standards or their latest revisions for more information:

1. OSHA, SAFETY AND HEALTH STANDARDS, 29CFR 1910, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
2. ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING, obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
3. NIOSH, SAFETY AND HEALTH IN ARC WELDING AND GAS WELDING AND CUTTING, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
4. ANSI Standard Z87.1, SAFE PRACTICES FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018
5. ANSI Standard Z41.1, STANDARD FOR MEN'S SAFETY-TOE FOOTWEAR, obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018
6. ANSI Standard Z49.2, FIRE PREVENTION IN THE USE OF CUTTING AND WELDING PROCESSES, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018
7. AWS Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES, obtainable from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
8. NFPA Standard 51, OXYGEN-FUEL GAS SYSTEMS FOR WELDING, CUTTING AND ALLIED PROCESSES, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
9. NFPA Standard 70, NATIONAL ELECTRICAL CODE, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
10. NFPA Standard 51B, CUTTING AND WELDING PROCESSES, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
11. CGA Pamphlet P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, obtainable from the Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202
12. CSA Standard W117.2, CODE FOR SAFETY IN WELDING AND CUTTING, obtainable from the Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3
13. NWSA booklet, WELDING SAFETY BIBLIOGRAPHY obtainable from the National Welding Supply Association, 1900 Arch Street, Philadelphia, PA 19103
14. American Welding Society Standard AWSF4.1, RECOMMENDED SAFE PRACTICES FOR THE PREPARATION FOR WELDING AND CUTTING OF CONTAINERS AND PIPING THAT HAVE HELD HAZARDOUS SUBSTANCES, obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
15. ANSI Standard Z88.2, PRACTICE FOR RESPIRATORY PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018

2. Electromagnetic Compatibility

WARNING 1

Extra precautions for Electromagnetic Compatibility may be required when this Welding Power Source is used in a domestic situation.

2.1 Installation and use - Users Responsibility

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing the welding circuit, see NOTE 1.

In other cases it could involve constructing an electromagnetic screen enclosing the Welding Power Source and the work, complete with associated input filters. In all cases, electromagnetic disturbances shall be reduced to the point where they are no longer troublesome.

NOTE 1

The welding circuit may or may not be earthed for safety reasons. Changing the earthing arrangements should only be authorised by a person who is competent to assess whether the changes will increase the risk of injury, e.g. by allowing parallel welding current return paths which may damage the earth circuits of other equipment. Further guidance is given in IEC 974-13 Arc Welding Equipment - Installation and use (under preparation).

2.2 Assessment of Area

Before installing welding equipment, the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account

i) Other supply cables, control cables, signalling and telephone cables above, below and adjacent to the welding equipment.

ii) Radio and television transmitters and receivers.

iii) Computer and other control equipment.

iv) Safety critical equipment, e.g. guarding of industrial equipment.

v) The health of people around, e.g. the use of pacemakers and hearing aids.

vi) Equipment used for calibration and measurement.

vii) The time of day that welding or other activities are to be carried out.

viii) The immunity of other equipment in the environment: the user shall ensure that other equipment being used in the environment is compatible: this may require additional protection measures.

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

2.3 Methods of Reducing Electromagnetic Emissions

a) Mains Supply
Welding equipment should be connected to the mains supply according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of permanently installed welding equipment in metallic conduit or equivalent.

Shielding should be electrically continuous throughout its length. The shielding should be connected to the Welding Power Source so that good electrical contact is maintained between the conduit and the Welding Power Source enclosure.

b) Maintenance of Welding Equipment
The welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturer's instructions. In particular, the spark gaps of arc striking and stabilising devices should be adjusted and maintained according to the manufacturer's recommendations.

c) Welding Cables
The welding cables should be kept as short as possible and should be positioned close together, running at or close to the floor level.

d) Equipotential Bonding
Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching the metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

e) Earthing of the Workpiece
Where the workpiece is not bonded to earth for electrical safety, nor connected to earth because of it's size and position, e.g. ship's hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

f) Screening and Shielding
Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening the entire welding installation may be considered for special applications.

3. General Information

The TRANSMIG 500i is a constant voltage / constant current DC inverter power source incorporating the latest digital inverter technology to provide exceptional DC arc characteristics.

The TRANSMIG 500i can be used for constant voltage or constant current welding processes including Gas Tungsten Arc Welding (GTAW – commonly TIG), Manual Metal Arc Welding (MMAW – commonly STICK), Carbon Arc Gouging (CAG), Flux Cored Arc Welding (FCAW) and Gas Metal Arc Welding (GMAW-commonly MIG).

An ARC FORCE / INDUCTANCE control is also provided to allow adjustment of the arc stiffness for MMAW and GMAW processes.

The Power Source is designed to meet the broad operating needs of the metal fabrication industry where production efficiency is vital. They are designed to meet the requirements of international standard EN60974-1.

The TRANSMIG 500i in constant voltage mode (GMAW and FCAW processes) gives excellent performance on mild steel, stainless steel, aluminium, silicon bronze and some hard facing wires with Argon based shielding gases. The Power Source also gives excellent results on mild steel using Carbon Dioxide shielding gas.

The following instructions detail how to correctly set up the machine and give guidelines on gaining the best production efficiency from the Power Source. Please read these instructions thoroughly before using your TRANSMIG 500i.

3.1 User Responsibility

This equipment will perform as per the information contained herein when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Defective equipment (including welding leads) should not be used. Parts that are broken, missing, plainly worn, distorted or contaminated, should be replaced immediately. Should such repairs or replacements become necessary, it is recommended that such repairs be carried out by appropriately qualified persons approved by CIGWELD. Advice in this regard can be obtained by contacting CIGWELD.

This equipment or any of its parts should not be altered from standard specification without prior written approval of CIGWELD. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use or unauthorised modification from standard specification, faulty maintenance, damage or improper repair by anyone other than appropriately qualified persons approved by CIGWELD.

3.2 Duty Cycle

The rated duty cycle of a welding Power Source is the operating time it may be used at its rated output current without exceeding the temperature limits of the insulation of the component parts. To explain the ten minute duty cycle period the following example is used. Suppose a welding Power Source is designed to operate at 60% duty cycle, 560 amperes at 42 volts. This means that it has been designed and built to provide the rated amperage (560A) at the rated load voltage (42V), for 6.0 minutes out of every 10 minute period (60% of 10 minutes is 6.0 minutes). During the other 4.0 minutes of the 10 minute period the Power Source must idle and be allowed to cool. The thermal cut-out will operate if the duty cycle is exceeded.

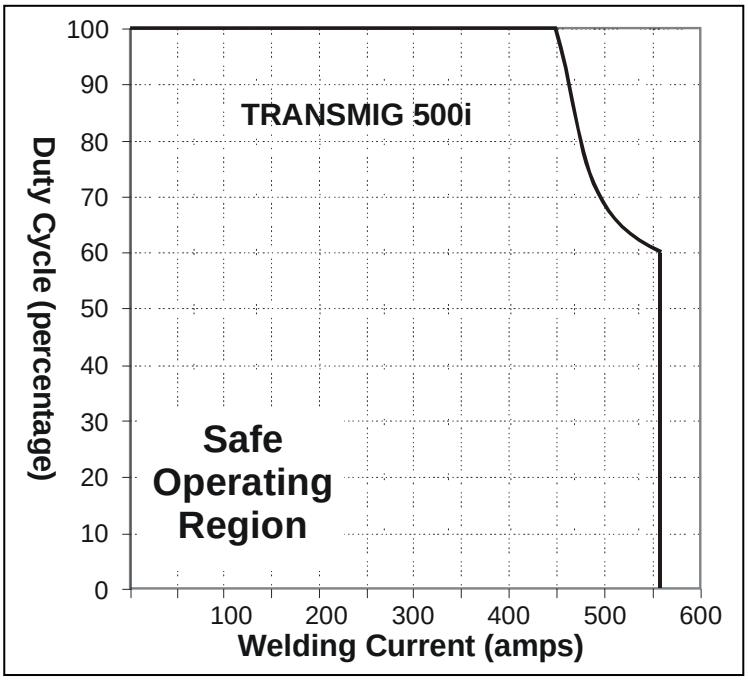


Figure 1 – TRANSMIG 500i Duty Cycle

3.3 Terms Of Warranty - November 2003

1. The Trade Practices Act 1974 (Commonwealth) and similar State Territory legislation relating to the supply of goods and services, protects consumers' interests by ensuring that consumers are entitled in certain situations to the benefit of various conditions, warranties, guarantees, rights and remedies (including warranties as to merchantability and fitness for purpose) associated with the supply of goods and services. A consumer should seek legal advice as to the nature and extent of these protected interests. In some circumstances, the supplier of goods and services may legally stipulate that the said conditions, warranties, guarantees, rights and remedies are limited or entirely excluded. The warranties set out in Clause 2 shall be additional to any non-excludable warranties to which the Customer may be entitled pursuant to any statute.

2. Subject to Clause 3. CIGWELD gives the following warranties to the Customer:

   Insofar as they are manufactured or imported by CIGWELD, goods will upon delivery be of merchantable quality and reasonably fit for the purpose for which they are supplied by CIGWELD.

   CIGWELD will repair or, at its option, replace those of the goods which, upon examination, are found by CIGWELD to be defective in workmanship and/or materials.

   CIGWELD reserves the right to request documented evidence of date of purchase.

3. The Warranty in Clause 2;

   Is conditional upon:

   The Customer notifying CIGWELD or our Accredited Distributor in writing of its claim within seven (7) days of becoming aware of the basis thereof, and at its own expense returning the goods which are the subject of the claim to CIGWELD or nominated Accredited Distributor/Accredited Service Provider.

   The goods being used in accordance with the Manufacturer's Operating Manuals, and under competent supervision.

   Does not apply to:

   Obsolete goods sold at auction, second-hand goods and prototype goods.

   Breakdown or malfunction caused by accident, misuse or normal wear and tear.

   Repairs or replacement made other than by CIGWELD or Accredited Service Providers, unless by prior arrangement with CIGWELD.

   Replacement parts or accessories which may affect product safety or performance and which are not manufactured, distributed or approved by CIGWELD.

4. CIGWELD declares that, to the extent permitted by law, it hereby limits its liability in respect of the supply of goods which are not of a kind ordinarily acquired for personal, domestic or household use or consumption to any one or more of the following (the choice of which shall be at the option of CIGWELD).

   The replacement of the goods or the supply of equivalent goods.

   The repair of goods.

   The payment of cost of replacing the goods or acquiring equivalent goods.

   The payment of the cost of having goods repaired.

5. Except as provided in Clauses 2 to 4 above, to the extent permitted by statute, CIGWELD hereby excludes all liability for any loss, damage, death or injury of any kind whatsoever occasioned to the Customer in respect of the supply of goods including direct, indirect, consequential or incidental loss, damage or injury of any kind.

3.4 Warranty Schedule - November 2003

These warranty periods relate to the warranty conditions in clause 2. All warranty periods are from date of sale from the Accredited Distributor of the equipment. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date CIGWELD delivered the product to the Accredited Distributor. Unless otherwise stated the warranty period includes parts and labour.

CIGWELD reserves the right to request documented evidence of date of purchase.

MIG AND MULTI PROCESS EQUIPMENT	***WARRANTY PERIOD***
TRANSMIG 500i	
Main Power Magnetics	3 years
Original Main Power Rectifier, Control P.C. Boards	1 year
All other circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, power switch semi-conductors	1 year

Please note that the information detailed in this statement supersedes any prior published data produced by CIGWELD.

WARNING 2

For the purpose of safety and performance and to protect your CIGWELD Equipment Warranty always use genuine CIGWELD replacement parts and accessories.

4. Safe Practices For The Use Of Welding Equipment

In many situations the "striking" voltage can be hazardous. Any person touching simultaneously the electrode lead/terminal and the work lead/terminal may receive a serious electrical shock. Additional precautions must be exercised where two Welding Power Sources are being used close to each other because, under certain conditions, the voltages between the welding terminals of the two Welding Power Sources could be two times the specified open circuit voltage.

It is essential that the Welding Power Source be correctly installed, if necessary, by a qualified electrician and maintained in sound mechanical and electrical condition. It is also important that the Welding Power Source be switched off when not in use.

4.1 Precautions to be Taken by Operators

- Whenever practicable, all parts of the welding circuit should be isolated from earth and other conducting material and under no circumstances should any earthing conductor of the electrical installation be used in place of the work lead.
- The Mains supply voltage should be switched off before connecting or disconnecting welding leads. Welding lead connections must have clean contact surfaces and must be securely tightened. Poor connections will result in overheating and loss of welding current. All parts of the welding circuit, including the return paths, are to be considered electrically alive, so the operator must ensure that no part of the body is placed in such a position that it will provide a path for an electric current.
- Welding operators should avoid direct contact with the work to be welded or against any metal in contact with the work. When this cannot be avoided the operator must not touch any exposed portion of the electrode holder with any part of the body. Should this occur, the operator will risk completing the electrical circuit through the body.
- When welding in confined spaces, where reasonable movement is restricted, particular care must be taken to ensure that the area is well ventilated and the operator is under constant observation by a person who can immediately switch off the power and give assistance in an emergency.
- The flux covering of an electrode cannot be assumed to provide effective insulation, consequently an insulating glove must be worn when placing an electrode into its holder, or should it be necessary to handle an electrode once it is in contact with its holder.
- During pauses between welding runs, Electrode holders, TIG torches, and MIG torches should be so placed that they cannot make electrical contact with persons or conductive objects.
- The welding leads, both the Electrode lead / TIG torch lead / MIG torch lead and the work lead, must be protected from damage. Damaged leads must not be used.
- Keep combustible materials away from the welding area. Have a suitable fire extinguisher handy.
- Do not stand on damp ground when welding.

4.2 Personal Protection

The radiation from an electric arc during the welding process can seriously harm eyes and skin. It is essential that the following precautions be taken:

- Gloves should be flameproof gauntlet type to protect hands and wrists from heat burns and harmful radiations. They should be kept dry and in good repair.
- Protective clothing must protect the operator from burns, spatter and harmful radiation. Woollen clothing is preferable to cotton because of its greater flame resistance. Clothing should be free from oil or grease. Wear leggings and spats to protect the lower portion of the legs and to prevent slag and molten metal from falling into boots or shoes.

- Face Shield

  It is recommended to use a welding face shield, conforming to the relevant standards, when electric arc welding. Use a welding face shield in serviceable condition and fitted with an eye filter lens to safely reduce harmful radiation from the arc as per Table 1.

NOTE 2

The filter lenses in the chart are only a recommendation and welders should select the shade of their choice.

Description of Process	Approximate Range of Welding Current Amperes	Filters Recommended Shade Number
MMAW Stick Welding Electrodes	40-100	8
MMAW Stick Welding Electrodes	100-200	10
MMAW Stick Welding Electrodes	200-300	11
MMAW Stick Welding Electrodes	300-400	12
MMAW Stick Welding Electrodes	Over 400	13
GTAW Tungsten Inert Gas (TIG)	5-100	10
GTAW Tungsten Inert Gas (TIG)	100-200	11
GTAW Tungsten Inert Gas (TIG)	200-250	12
GTAW Tungsten Inert Gas (TIG)	250-350	13
GTAW Tungsten Inert Gas (TIG)	Over 350	14
GMAW Metal Inert Gas (MIG)	40-150	10
GMAW Metal Inert Gas (MIG)	150-250	11
GMAW Metal Inert Gas (MIG)	250-300	12
GMAW Metal Inert Gas (MIG)	300-400	13
GMAW Metal Inert Gas (MIG)	Over 400	14
CAG Carbon Arc Gouging	Up to 400	12
CAG Carbon Arc Gouging	Over 400	14

Table 1 – Filter lens size verses welding current

Protective filter lenses are provided to reduce the intensity of radiation entering the eye thus filtering out harmful infra-red, ultra-violet radiation and a percentage of the visible light. Such filter lenses are incorporated within face shields. To prevent damage to the filter lenses from molten or hard particles an additional hard clear glass or special clear external cover lens is provided. This cover lens should always be kept in place and replaced before the damage impairs your vision while welding.

5. Resuscitation For Electric Shock Victims

Electric shock may kill immediately. Early resuscitation is required if a life is to be saved. Every Second Counts! Electrical currents may:

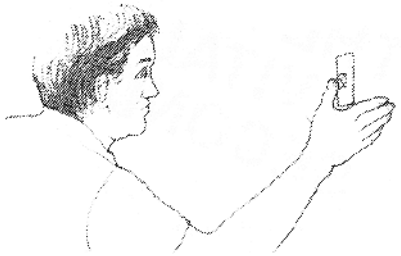
- Stop the heart;
- Cause contraction of the muscles of the body;
- Cause burns;
- Paralyse breathing due to paralysis of the centre of respiration in the brain.

The victims often cannot free themselves from the current and may not be able to breathe due to fixation of the chest.

5.1 Resuscitation

Efficient resuscitation requires training which is available from the St John's Ambulance Association, Red Cross and other sources.

1 Don't become a victim. Switch off power if possible. If not, remove victim from contact, using some insulating material.



2 If unconscious, place victim on their side and clear vomit and other foreign matter from mouth. Check for breathing by look, listen and feel. If not breathing, commence expired air resuscitation (E.A.R.). This should take no longer than 3 or 4 seconds.

3 Place victim flat on their back on a hard surface, open airway - using head tilt and jaw support as shown.

4 Begin artificial breathing - 5 full breaths in 10 seconds, sealing nostrils with cheek or holding nose closed.

5 Check carotid pulse in neck. If pulse is present, continue E.A.R.
15 breaths per minute for adults.
20 breaths per minute for children.

6 If pulse is absent and you have been trained, begin cardio pulmonary resuscitation (C.P.R). Cardiac Compression - depress lower end of breast bone (sternum) 4cm to 5cm, less for small children.
<u>One rescuer</u> - 2 breaths, 15 compressions in 15 seconds, i.e. 4 cycles per minute.
<u>Two rescuers</u> - 1 breath, 5 compressions in 5 seconds, i.e. 12 cycles per minute.

7 Check for return of pulse and breathing after 1 minute and at least every 2 minutes. Continue uninterrupted until trained assistance is available. When breathing and pulse return, turn on side and continue observation.

6. Specifications

6.1 Machine Specifications

Description (Refer NOTE 3)	TRANSMIG 500i	
Power Source Mass	70kg (154 lb)	
Power Source Dimensions	681 x 379 x 584mm (26.8" x 14.9" x 23") H x W x D	
Power Source Part Number	710020	
Primary input voltage ❄	**415V 3 phase**	**440V 3 phase**
Number of Phases	3∅	3∅
Frequency	50 / 60 Hz	50 / 60 Hz
Rated Input Current @ 100% Duty Cycle	∇ 34A	∇ 32A
Rated kVA @ 100% Duty Cycle	24.2 kVA	23.9 kVA
100% Duty Cycle Output Rating	450A @ 38V	450A @ 38V
Maximum Input Current	42 A	41 A
Rated kVA @ Maximum Output Current	30.2 kVA	31.1 kVA
Maximum Output Rating / Duty Cycle	560A @ 42V / 60%	560A @ 42V / 60%
Generator Requirements	♣ 35 kVA	♣ 35 kVA
Power Factor @ max. output	0.86	0.88

Recommended Primary Lead Maximum Weld Current Recommended Fuse Size ✦ Maximum kVA at Rated Weld Current	4 Core, 6mm^2 560A @ 60% Duty Cycle ✦ 63A Fuse 30.2 kVA	4 Core, 6mm^2 560A @ 60% Duty Cycle ✦ 63 Amp Fuse 31.1 kVA
Welding Current @ 100% Duty Cycle	450A @ 100%	450A @ 100%

Open Circuit Voltage Range	10 to 40V (GMAW) 66V (MMAW) 66V (GTAW)	10 to 44V (GMAW) 66V (MMAW) 66V (GTAW)
Output Current Range	30 to 560A	30 to 560A
Rated Output Duty Cycle	560A @ 60%	560A @ 60%
Duty Cycle Period	10 minutes	

∇ The Rated Input Current should be used for the determination of cable size & supply requirements.

✦ Motor start fuses or thermal circuit breakers are recommended for this application. Check local requirements for your situation in this regard.

♣ Minimum Generator Requirements at the Maximum Output Duty Cycle.

❄ The installed EMC filter required for compliance with C-TICK is rated at 50A only. If using the TRANSMIG 500i on 220V 3 Phase, the maximum output current allowable is 330ADC

NOTE 3

Due to variations that can occur in manufactured products, claimed performance, voltages, ratings, all capacities, measurements, dimensions and weights quoted are approximate only. Achievable capacities and ratings in use and operation will depend upon correct installation, use, applications, maintenance and service.

6.2 Power Source Dimensions

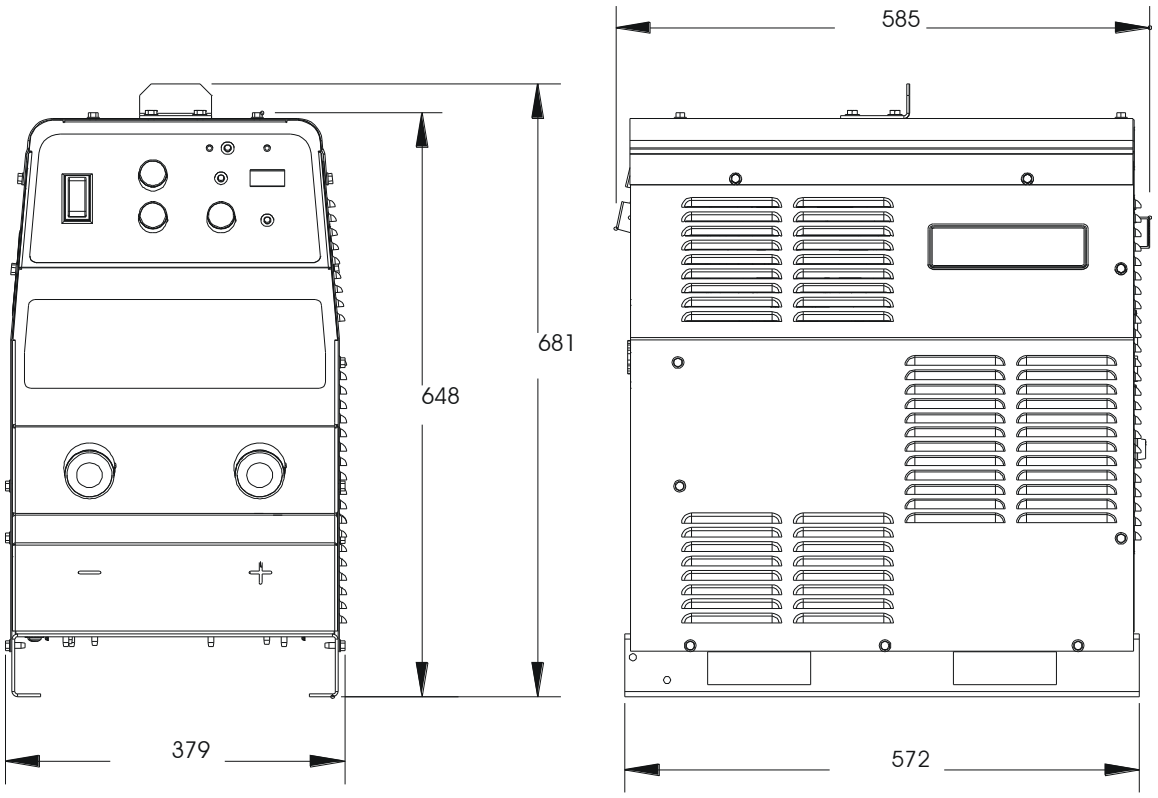


Figure 2 – TRANSMIG 500i Dimensions

7. Standard Power Source Features

7.1 Short Circuit Protection

The output of the power source can be short circuited in any of the modes of operation. This protection feature will instantly limit the output current to a safe value, to assure reliable operation of the power source.

7.2 Output Overload Protection

The Overload Protection feature will limit the continuous welding current to the maximum value listed in the specifications for any of the modes of operation. This power source will continue to operate, but the welding current will be limited to this maximum value.

7.3 Cooling Fan Control

The Cooling Fans are designed to operate only when required. They will come on whenever the output contactor control of the power source is on. The fans will come on for several minutes when the power source is first turned on and will normally stay on for several minutes after the output contactor control has been switched off. The fans will turn off after several minutes of inactivity, to minimise the amount of dirt drawn into the power source, as well as to maximise the life of the fans.

7.4 Over-temperature Protection

If the power source overheats because of blocked air flow, excessive ambient temperatures, failed fan or other cause, the over-temperature protection will disable the output of the power source until it has cooled down. If the over-temperature protection circuit operates, it will turn on the indicator light on the front panel and the fans should continue to run until the power source cools. The over-temperature circuit will reset itself automatically once the power source has cooled

7.5 Multi Voltage Operation

The power source is designed to operate from a wide range of input line voltages as given in the specifications. The power source can be reconfigured for the different line voltages with a simple, rugged voltage changeover panel accessible from the rear panel of the power source.

7.6 Multi Process Operation

The power source has built in electronic controls which have been optimised for most welding processes. The following controls are standard: GTAW with Lift Start, MMAW, CAG, GMAW / FCAW including the short arc, globular and spray transfer modes.

Each mode of operation has a dedicated electronic control which has been optimised for that particular process.

8. Installation Recommendations

8.1 Environment

The TRANSMIG 500i is are NOT designed for use in environments with increased hazard of electric shock.

a) Examples of environments with increased hazard of electric shock are -
   i) In locations in which freedom of movement is restricted, so that the operator is forced to perform the work in a cramped (kneeling, sitting or lying) position with physical contact with conductive parts;
   ii) In locations which are fully or partially limited by conductive elements, and in which there is a high risk of unavoidable or accidental contact by the operator, or
   iii) In wet or damp hot locations where humidity or perspiration considerable reduces the skin resistance of the human body and the insulation properties of accessories.

b) Environments with increased hazard of electric shock do not include places where electrically conductive parts in the near vicinity of the operator, which can cause increased hazard, have been insulated.

8.2 Location

Be sure to locate the Power Source according to the following guidelines:

a) In areas, free from moisture and dust.

b) In areas, free from oil, steam and corrosive gases.

c) In areas, not subjected to abnormal vibration or shock.

d) In areas, not exposed to direct sunlight or rain.

e) In areas, with an ambient temperature of between -10 °C and 40 °C

f) Place at a distance of 30cm (1ft) or more from walls or similar that could restrict natural air flow for cooling.

g) The minimum ground clearance for these products is 75mm (3.0in)

8.3 Ventilation

Since the inhalation of welding fumes can be harmful, ensure that the welding area is effectively ventilated.

8.4 Mains Supply Voltage Requirements

The Mains supply voltage should be within ± 10% of the rated Mains supply voltage. Too low a voltage may cause poor welding performance or the wire feeder malfunction. Too high a supply voltage will cause components to overheat and possibly fail.

8.5 Minimum Mains Current Circuit Requirements for TRANSMIG 500i

The Welding Power Source must be:

- Correctly installed, if necessary, by a qualified electrician.
- Correctly earthed (electrically) in accordance with local regulations.
- Connected to the correct size **Mains Current Circuit** as per the Table 2.

The following Mains Current Circuit recommendations are required to obtain the maximum welding current and duty cycle from these welding products:

Model	Mains Supply Lead Size	Minimum Mains Current Circuit Size	Mains Supply Voltage	Weld Current & Duty Cycle
TRANSMIG 500i	6 mm^2	35 Amps	415V 3∅	560A @ 60%

Table 2 – Mains Current Circuit sizes

WARNING 3

CIGWELD advises that this equipment be electrically connected by a qualified electrical trades-person.

WARNING 4

The TRANSMIG 500i Mains supply leads should be replaced with leads as specified in section 8.5 when the TRANSMIG 500i Mains supply voltage is changed.

8.6 Mains Supply Cable Connection

The Mains supply voltage should be connected to the power source with a suitably rated cable (see table 2 above). The three mains phases connect to the INPUT POWER TERMINAL BLOCK, and the mains EARTH connects to the GROUND STUD. Access to these terminals is by removal of the side panel as shown.

The frame of this power source should be Earthed for personnel safety, and to assure operation of the over-current protection. The Earthing method, and the Earthing conductor size and type shall conform to local electrical codes.

WARNING 5

CIGWELD advises that this equipment must be electrically EARTHED.

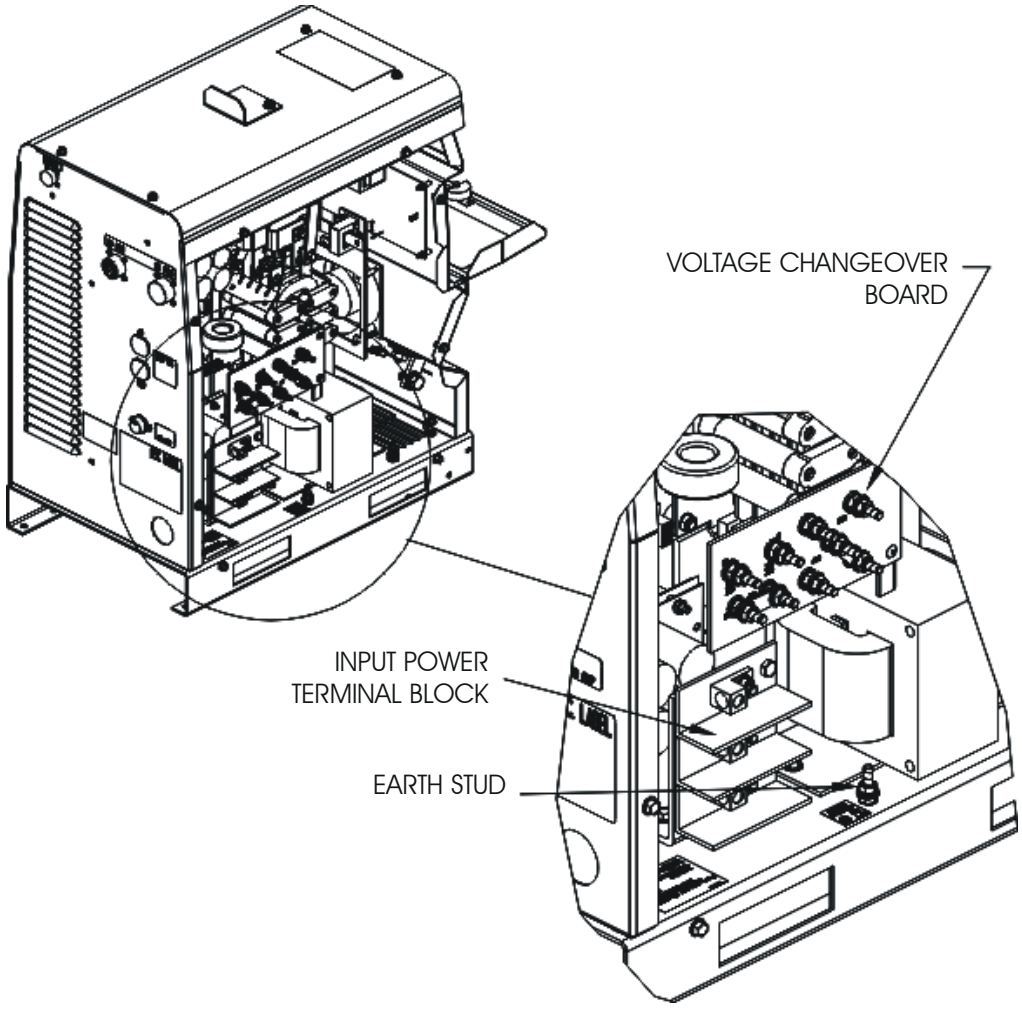


Figure 3 – TRANSMIG 500i Mains Supply Connection

8.7 Alternative Mains Supply Voltages

The TRANSMIG 500i is suitable for the following mains supply voltages.

Supply Voltage	Supply Lead Size	Rated Line Current at 450A 100% output	Max Line Current at 560A 60% output	Approx Line Fuse Size
200V-208V 3∅	16 mm^2	68 Amps	88 Amps	125 Amps
220V-230V 3∅	16 mm^2	62 Amps	82 Amps	125 Amps
400V-415V 3∅	6 mm^2	35 Amps	43 Amps	63 Amps
440V-460V 3∅	6 mm^2	30 Amps	39 Amps	63 Amps

Table 3 – Alternative Mains Current Circuit sizes

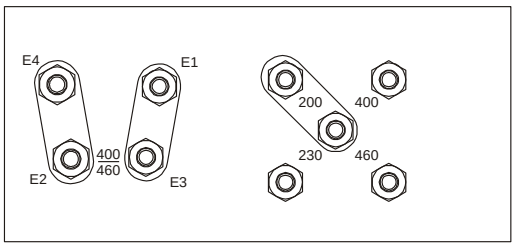
8.8 De-rating for Supply Voltages of 230V and below

The TRANSMIG 500i is fitted with an internal EMC filter for compliance with AS/NZS 3652-(EMC Directive EN50199), which has a rating of 50A. With a supply voltage of 230V and below, the rating of this filter will be exceeded. The TRANSMIG 500i will need to be de-rated to a maximum output current of 330A DC.

CAUTION 1

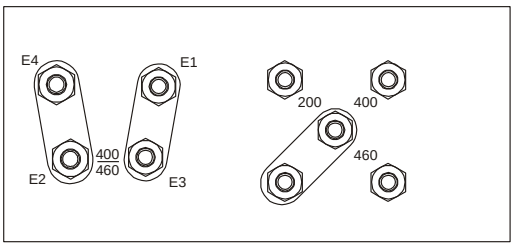
The TRANSMIG 500i must be de-rated when used with a supply voltage of 230V and below.

Connect the Voltage Change-over links for the Supply Voltage in your area.



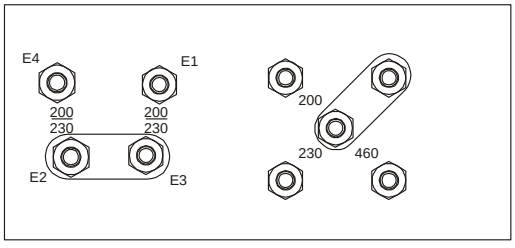
200 VOLT CONNECTION

Figure 4 – 200-208V Connection



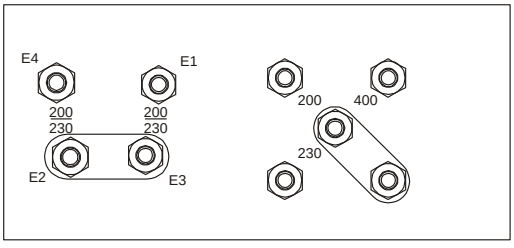
230 VOLT CONNECTION

Figure 5 – 220-230V Connection



400 VOLT CONNECTION

Figure 6 – 400-415V Connection



460 VOLT CONNECTION

Figure 7 – 440-460V Connection

8.9 Welding Leads

The Welding Leads connect to the Output Terminals of the Power Source. Selection of the proper size of welding leads should be based on the rated current rating of the welding cable as well as the voltage drop of the welding cable. When considering Voltage Drop, the entire loop (electrode plus work lead) must be considered.

As a general rule, the welding cables should be as short as possible and placed close together. Try to avoid coiling the welding cables if possible. A damaged or frayed welding cable should not be used, all connections must be properly tightened.

Average Welding Current	**Total length of welding circuit (Electrode lead plus work lead)**				
	15m	**30m**	**45m**	**60m**	**75m**
100	16mm^2	16mm^2	35mm^2	50mm^2	50mm^2
150	25mm^2	25mm^2	50mm^2	50mm^2	70mm^2
200	35mm^2	35mm^2	50mm^2	70mm^2	95mm^2
250	50mm^2	50mm^2	70mm^2	95mm^2	120mm^2
300	50mm^2	50mm^2	95mm^2	120mm^2	2x70mm^2
350	70mm^2	70mm^2	120mm^2	2x70mm^2	2x70mm^2
400	95mm^2	95mm^2	120mm^2	2x70mm^2	2x95mm^2
450	95mm^2	95mm^2	120mm^2	2x95mm^2	2x95mm^2
500	120mm^2	120mm^2	2x70mm^2	2x95mm^2	2x125mm^2
550	120mm^2	120mm^2	2x70mm^2	2x125mm^2	2x125mm^2
600	120mm^2	120mm^2	2x95mm^2	2x125mm^2	2x125mm^2

Table 4 – Recommended Welding Cable Sizes

9. Set Up For TRANSMIG 500i Power Source (GMAW)

a) Remove all packaging materials.

CAUTION 2

To obtain adequate air flow and cooling for the Power Source components, do not obstruct the integral 75mm (3.0") supports. Alternatively the optional wheeling kit may be fitted.

b) Connect the work lead to the negative (–) socket (positive + for Flux Cored Wire)

c) Connect the *WIREFEEDFER* lead to the positive (+) socket (negative – for Flux Cored Wire)

d) Connect the Wire Feeder control cable to the 14 or 19 pin control socket on the rear of the machine.

e) Set the Front Panel control Mode Switch to GMAW.

f) If the Wire feeder has remote voltage control, set the Local / Remote switch on the front panel to the REMOTE position.

g) Set the digital meter to VOLTS, the control knob can now preset the welding voltage.

h) Set the Inductance Control to the desired inductance. Clockwise is higher inductance. Higher settings make the arc softer with less spatter. Lower inductance settings will give a stronger *driving* arc. The inductance should be set according to the type of wire and gas and desired arc characteristic desired. Generally the Inductance Control can be set at mid scale.

i) If the optional Wheeling Kit is used, position a gas cylinder on the rear tray and lock securely to the Power Source cylinder bracket with the chain provided . If this arrangement is not used then ensure that the gas cylinder is secured to a building pillar, wall bracket or otherwise securely fixed in an upright position.
Fix the cable stowage hook to the Power Source cylinder bracket with the bolts provided

j) Fit the gas Regulator / Flow-meter to the gas cylinder.

k) Connect the gas hose from the Wire feeder Interconnection to the Flow-meter outlet.

l) Fit the electrode wire spool to the wire reel hub located behind the electrode wire compartment door. Ensure that the drive dog-pin engages the mating hole in the wire spool. Push the 'R' clip into place to retain the wire spool securely. The wire should feed from the bottom of the spool.

m) MIG Torch
Fit the MIG Torch to the Wire feeder by pushing the torch connector into the brass torch adaptor and screwing the locking nut clockwise to secure the torch to the torch adaptor. Remove the contact tip from the torch handset.

n) Ensure the Wire feeder feed rollers correctly match the wire size being used, and have the chosen wire size marking facing outwards.

o) Lift up the wire feeder pressure lever and pass the electrode wire through the inlet guide, between the rollers, through the outlet guide and into the torch.

p) Lower the pressure lever and with the torch lead reasonably straight, feed the wire through the torch. Fit the appropriate contact tip.

WARNING 6

The electrode wire will be at welding voltage potential whilst it is being fed through the system.

10. Set Up For TRANSMIG 500i Power Source (GTAW)

a) Remove all packaging materials.

CAUTION 3

To obtain adequate air flow and cooling for the Power Source components, do not obstruct the integral 75mm (3.0") supports. Alternatively the optional wheeling kit may be fitted.

b) Connect the work lead to the positive (+) socket.

c) Connect the *TIG TORCH* lead to the negative (-) socket

d) Set the Front Panel control Mode Switch to GTAW.

e) If a Remote Foot Pedal or Torch Slider is being used, this can be connected to the 14 or 19 pin control socket on the rear of the machine, and set the Local / Remote switch on the front panel to the REMOTE position.

f) Set the digital meter to AMPS, the control knob can now preset the welding current.

g) If the optional Wheeling Kit is used, position a gas cylinder on the rear tray and lock securely to the Power Source cylinder bracket with the chain provided . If this arrangement is not used then ensure that the gas cylinder is secured to a building pillar, wall bracket or otherwise securely fixed in an upright position.
Fix the cable stowage hook to the Power Source cylinder bracket with the bolts provided

h) Fit the gas Regulator / Flow-meter to the gas cylinder.

i) Connect the gas hose from the TIG TORCH to the Flow-meter outlet.

j) Select the proper Tungsten Electrode for the size and type of job.

k) If a remote trigger switch is not being used, it will be necessary to turn the Output Contactor Switch to ON.

 ***WARNING 7***

The electrode will be at welding voltage potential when the Output Contactor switch is set to ON.

11. Set Up For TRANSMIG 500i Power Source (MMAW)

a) Remove all packaging materials.

CAUTION 4

To obtain adequate air flow and cooling for the Power Source components, do not obstruct the integral 75mm (3.0") supports. Alternatively the optional wheeling kit may be fitted.

b) Connect the work lead to the negative (-) socket.

c) Connect the *ELECTRODE HOLDER* lead to the positive (+) socket

d) Set the Front Panel control Mode Switch to MMAW.

e) If a Remote Foot Pedal is being used, this can be connected to the 14 or 19 pin control socket on the rear of the machine, and set the Local / Remote switch on the front panel to the REMOTE position.

f) Set the digital meter to AMPS, the control knob can now preset the welding current.

g) Set the Arc Force Control to the desired setting. Clockwise is maximum. Higher settings will give the arc more *dig* or *drive* by increasing the short circuit current available.

h) Energize the output of the power source by turning the Output Contactor Switch to ON.

 ***WARNING 8***

The electrode will be at welding voltage potential when the Output Contactor switch is set to ON.

12. Set Up For TRANSMIG 500i Power Source (CAG)

a) Remove all packaging materials.

CAUTION 5

To obtain adequate air flow and cooling for the Power Source components, do not obstruct the integral 75mm (3.0") supports. Alternatively the optional wheeling kit may be fitted.

b) Connect the work lead to the negative (-) socket.

c) Connect the *GOUGING TORCH* lead to the positive (+) socket

d) Set the Front Panel control Mode Switch to CAG.

e) If a Remote Foot Pedal is being used, this can be connected to the 14 or 19 pin control socket on the rear of the machine, and set the Local / Remote switch on the front panel to the REMOTE position.

f) Set the digital meter to AMPS, the control knob can now preset the welding current.

g) If the Gouging Torch requires Compressed Air, connect to a compressed air source.

h) Energize the output of the power source by turning the Output Contactor Switch to ON.

WARNING 9

The Gouging Rod will be at welding voltage potential when the Output Contactor switch is set to ON.

13. Power Source Controls, Indicators And Features

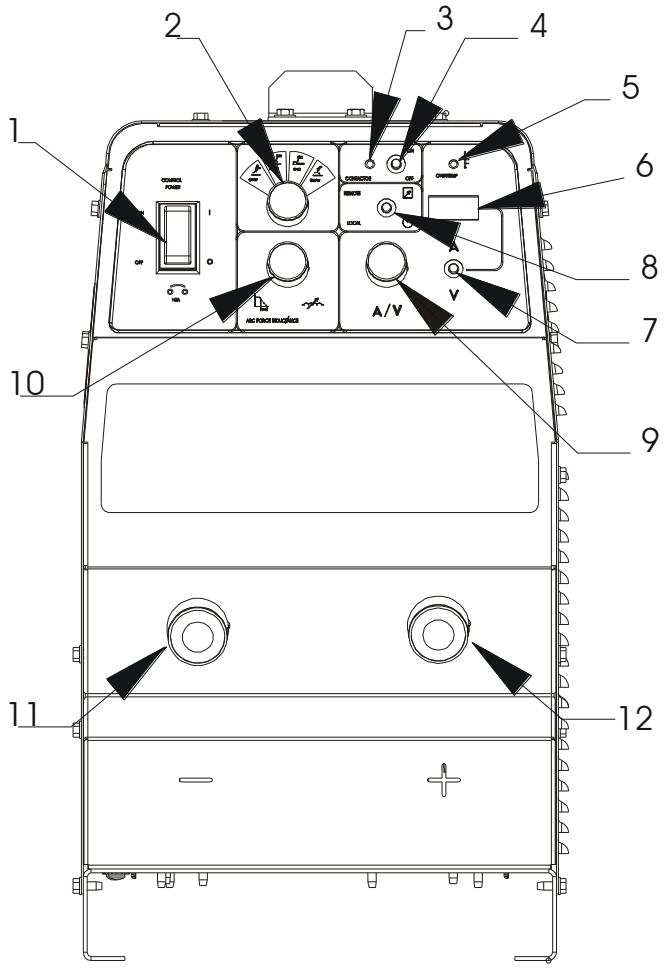


Figure 8 – TRANSMIG 500i Front Panel

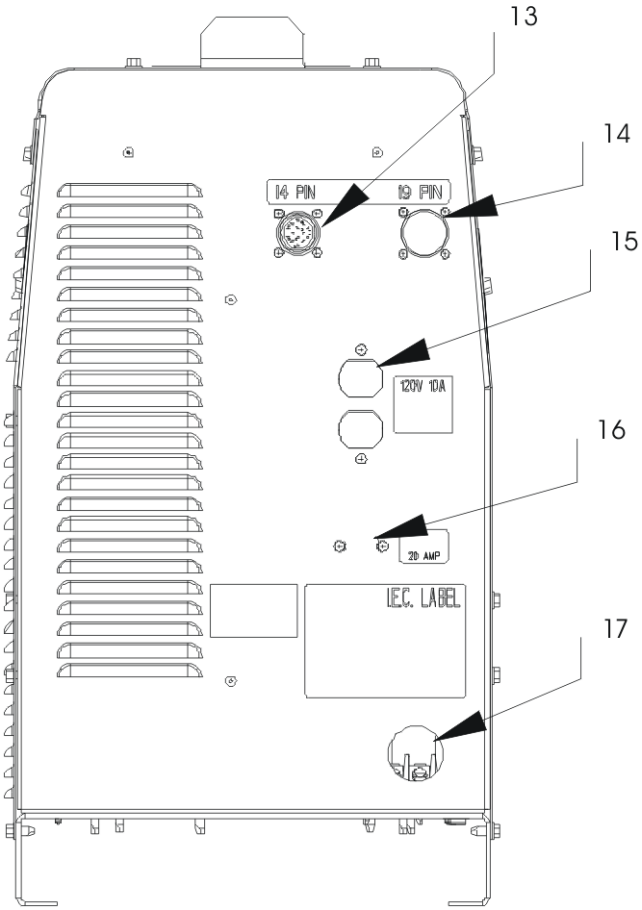


Figure 9 – TRANSMIG 500i Rear Panel

13.1 Control Power ON/OFF Switch

This circuit breaker / switch activates the controls on the Power Source. When this switch is OFF, the Power Source is in Standby Mode. There is still Line Voltage present internally but the controls are not energised. In the ON position, the digital meter display should be ON. This circuit breaker also protects the auxiliary 24VAC and 120VAC power in case of an overload. If this circuit breaker trips, determine the cause of the overload before resetting, and allow breaker time to cool before resetting.

13.2 Mode Select Switch

The Mode Select Switch is a four position switch used to select the weld process. The four modes are as follows:

GTAW – in this mode the power source operates in constant current mode with a lift arc starting circuit activated and arc force / inductance disabled. The lift arc circuit allows the arc to be initiated by momentarily touching the tungsten to the work and then lifting. The lift arc circuit limits the touch current to a low value and then switches to the preset current after lifting. The lift arc feature can be disabled if desired to allow scratch starting by moving two jumpers internal to the machine on the main control board. (see section 13.18 for instructions on how to disable the lift arc feature)

MMAW - in this mode the power source operates in constant current mode with the arc force / inductance enabled.

CAG - in this mode the power source operates in constant current mode with the arc force / inductance disabled.

GMAW - in this mode the power source operates in constant voltage mode with the inductance control enabled. A wire sharpening circuit is also active to help condition the end of the wire when the next weld is complete to improve the arc start on the next weld. The wire sharpening feature can be disabled if desired. (see section 13.19 for instructions on how to disable the wire sharpening feature)

13.3 Output Contactor Indicator

This green light will be ON whenever the output of the power source is energised.

13.4 Output Contactor Switch

This switch is used to energise the output of the power source.

13.5 Thermal Overload

This Amber light will be ON whenever an over temperature condition has been detected internal to the power source. This light will remain ON with fans running until the unit cools down. If this light is ON the output of the power source will be disabled. Once the power source cools down this light will go OFF and the over temperature condition will automatically reset.

13.6 Digital Meter

The Digital Meter is used to preset the output voltage or current when the power source is not welding, and to display the actual amps or volts while welding.

To preset the output current for GTAW, MMAW or CAG, place the meter Amps / Volts switch in the Amps position and adjust the main Amps / Volts control potentiometer to the desired current. To preset the output voltage for GMAW, place the meter Amps / Volts switch in the Volts position and adjust the main Amps / Volts control potentiometer to the desired voltage.

The meter will automatically switch over to actual amps or volts while welding, depending on the position of the Amps / Volts switch.

13.7 Meter Amps / Volts Switch

This two position toggle switch is used to select whether the digital meter will display amps or volts.

To preset weld current for GTAW, MMAW or CAG, place this switch in the Amps position. To preset weld voltage for GMAW, place this switch in the Volts position.

After an arc has been initiated, this switch allows either actual weld amps or weld volts to be displayed on the Digital Meter.

13.8 Remote / Local Switch

The Remote / Local toggle switch is used to select either front panel control of the output Amps / Volts (LOCAL mode), or remote control of the output Amps / Volts through the 19 pin or 14 pin receptacles located on the rear panel (REMOTE mode). For GTAW mode, the maximum output current must be preset by the front panel Amps / Volts control potentiometer. For all other modes, the remote control is full output of the power source.

13.9 Amps / Volts Control

This control potentiometer sets the output Amps or Volts depending on the weld process. Clockwise is increasing output. For all modes except GTAW, this control potentiometer is only active when the Local / Remote switch is in the Local position. For GTAW this control potentiometer is used to set the maximum weld current available to a foot pedal or torch slider control. To preset the maximum output for GTAW, place the Local / Remote switch in the Local mode and set the desired amperage on the digital meter. (The meter Amps / Volts switch must be in the Amps position). Place the Local / Remote switch in the Remote position to activate the foot pedal or torch slider control. The Foot pedal or torch slider will control the welding current only up to the value set by the Amps / Volts control potentiometer on the front panel.

For example, to set the maximum GTAW current for a torch slider to 250A, Set the meter Amps / Volts switch to Amps, set the Local / Remote switch to Local, adjust the main Amps / Volts control potentiometer to 250A. Set the Local / Remote switch to Remote. The torch slider will now adjust welding current between 5A (minimum amps available) and 250A only.

13.10 Arc Force / Inductance Control

This control potentiometer is active only in the MMAW (Stick) and GMAW (MIG) modes.

In MMAW mode, this potentiometer controls the amount of arc force or *dig* that the arc has. Maximum arc force is clockwise. This feature can be particularly beneficial in providing the operator with the ability to compensate for variability in joint fit up in certain situations with particular electrodes, eg cellulose and hydrogen controlled electrodes. In all welding processes, the amount of penetration obtained is dependent on the welding current; ie the greater the penetration the greater the current

Arc Force Position %	Effect on Welding Performance
Minimum (0)	Soft arc, Low spatter, Low penetration
Medium (20 to 50)%	Normal arc, Improved fusion characteristics, Normal penetration
Maximum (100)%	Hard arc, Deep penetration

Table 5 – Effect of Arc Force Control

In general, increasing the ARC FORCE control knob towards 100% (maximum) allows greater penetration control to be achieved. With the ARC FORCE control knob set to 0 (minimum) the Power Source has a constant current characteristic. In other words, varying the arc length does not significantly effect the welding current. When the ARC FORCE control knob is set to 100%, it is possible to control the welding current by varying the arc length. This is very useful for controlling penetration on root runs and side wall wash on vertical up fillet welds.

(a) Root runs

During root runs the weld pool forms a "keyhole" shape. If too much weld current is used, the hole blows out and the weld collapses. If too little weld current is used, the hole closes up and penetration is lost. The size of the hole also determines the arc length; ie as the hole gets bigger, the arc gets longer.

If arc force is used, the increase in the arc length causes the weld current to decrease until the hole starts to close up but if the hole closes up to much then the arc length decreases which causes the weld current to increase. Too little or too much arc force makes this process unstable. The operator must adjust the arc force until a happy medium is reached.

(b) Vertical up Welding

When welding vertical up with arc force on, the operator can control the amount of current by changing arc length ie voltage. Weld metal is deposited by "digging" the electrode into the side of the base metal joint and then increasing the arc length with a flicking motion, to allow the weld pool to freeze, before digging the electrode into the other side of the base metal joint.

Without arc force, increasing the arc length does not decrease the weld current sufficiently and the operator has to manually decrease the current via a remote current control to freeze the weld pool. This welding current reduction also reduces the penetration. The arc force allows the weld pool to freeze during the "flick" phase without decreasing the amount of weld current available during the "dig" phase thus maximising penetration.

In GMAW mode this becomes an inductance control. Higher inductance settings make the arc softer with less spatter. Lower inductance settings give a stronger driving arc.

The inductance potentiometer should be set according to the type of wire, gas and desired arc characteristics desired. Generally the inductance control can be set at mid range as a good starting point.

13.11Negative Welding Output Terminal

Connection for the negative (-) welding lead.

13.12Positive Welding Output Terminal

Connection for the positive (+) welding lead.

CAUTION 6

Loose welding terminal connections can cause overheating and result in the male plug being fused in the bayonet terminal.

13.13Remote Control 14 Pin Receptacle

The 14 pin receptacle allows the power source to interface with Wire feeders and remote controls such as a foot pedal. This receptacle provides auxiliary power, contactor control for energising the output of the power source, and remote control.

To make connections, align keyway, insert plug, and rotate threaded collar fully clockwise. The socket information is included in the event the supplied cable is not suitable and it is necessary to wire a plug or cable to interface with the 14-pin receptacle.

Socket Pin	Function
A	Input Supply 24VAC 10A with respect to Socket G (circuit common)
B	Output to energise the power supply contactor, 24VAC (Contact closure is provided between socket pins A and B to energise the contactor)
C	Remote Control Potentiometer Maximum
D	Control circuit common, Remote Control Potentiometer Minimum
E	Remote Control Potentiometer Wiper (0-10V) CV Mode : 0 to 10V gives 10 to 44V output Voltage CC Mode : 0 to 10V gives 5 to 560A output Amps
F	Scaled output current signal (1V=100A output current)
G	24VAC / 115VAC common
H	Scaled output voltage signal (1V=10V output voltage)
I	Input Supply 115VAC 10A with respect to Socket G (circuit common)
J	Output to energise the power supply contactor, 115VAC (Contact closure is provided between socket pins I and J to energise the contactor)
K	Chassis Ground (Mains Earth)
L	Not Used.
M	Not Used.
N	Not Used.

13.14Remote Control 19 Pin Receptacle

The 19 pin receptacle allows the power source to interface with Wire feeders and remote controls such as a foot pedal. This receptacle provides auxiliary power, contactor control for energising the output of the power source, and remote control.

To make connections, align keyway, insert plug, and rotate threaded collar fully clockwise. The socket information is included in the event the supplied cable is not suitable and it is necessary to wire a plug or cable to interface with the 19-pin receptacle.

If a remote control is plugged into BOTH the 14 pin and 19 pin receptacles the device plugged into the 19 pin receptacle will have control over the output current or voltage. Either device can control the power source output contactor circuit.

Socket Pin	Function
A	Power Source Contactor Circuit (+15V)
B	Power Source Contactor Circuit input (Contact closure is provided between socket pins A and B to energise the contactor)
C	Scaled output voltage signal (1V=10V output voltage)
D	Input Supply 24VAC 10A with respect to Socket F (circuit common)
E	Input Supply 115VAC 10A with respect to Socket F (circuit common)
F	24VAC / 115VAC common
G	Chassis Ground (Mains Earth)
H	Remote Control Potentiometer Maximum
J	Remote Control Potentiometer Wiper (0-10V) CV Mode : 0 to 10V gives 10 to 44V output Voltage CC Mode : 0 to 10V gives 5 to 560A output Amps
K	Remote Control Potentiometer Minimum
L	Control circuit common
M	Arc Established = +12V
N	Control circuit common
P	Input Supply 24VAC 10A with respect to Socket F (circuit common) Same as pin D
R	24VAC / 115VAC common. Same as pin F
S	Not Used.
T	Not Used.
U	Scaled output current signal (1V=100A output current)
V	Not Used.

13.15Auxiliary 120VAC Output Power

This receptacle can provide up to 10A 120VAC auxiliary power for powering wire feeders, water recirculators, CO_2 heaters etc.

13.16Control Fuse (Internal)

This Fuse protects the control transformer in the power source. If for any reason the fuse opens, it should be replaced with a fuse of a like amperage and voltage (20A, 600VAC).

13.17Input Power Access

This opening provides access to the input terminal block for the mains supply cable.

13.18Enable / Disable Lift Arc Starting Circuit (GTAW)

The Power Source is configured from the factory with the Lift Arc Starting Circuit active for GTAW. This feature should be disabled if an external high voltage arc starter is being used to start the arc. To disable the Lift Arc feature, proceed as follows:

a) Turn off the mains power to the power source, at the main disconnection point.
b) Remove the top panel to gain access to the main control circuit board.
c) To DISABLE Lift Arc, place jumpers JP1 and JP2 in the off position (pins 2-3 shorted).
d) To ENABLE Lift Arc, place jumpers JP1 and JP2 in the on position (pins 1-2 shorted).
e) Replace the top panel.

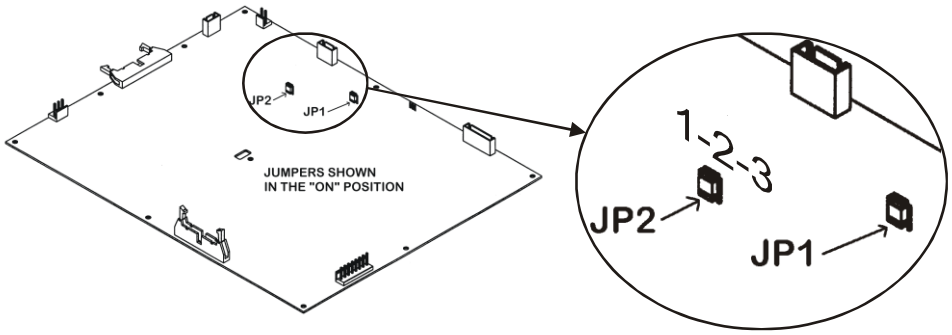


Figure 10 – Enable / Disable Lift Arc in GTAW mode

13.19Enable / Disable Wire Sharpening Circuit (GMAW)

The Power Source is configured from the factory with the Wire Sharpening Circuit active for GMAW. This feature improves Arc Starting by reducing the size of the ball on the wire at the end of the weld. To disable this feature, proceed as follows:

a) Turn off the mains power to the power source, at the main disconnection point.
b) Remove the top panel and side panels to gain access to the display circuit board.
c) Remove the knobs and hardware from the front panel to allow removal of the display board.
d) To DISABLE Wire Sharpening, place jumpers JP1 in the off position (pins 3-4 shorted).
e) To ENABLE Wire Sharpening, place jumpers JP1 in the on position (pins 1-2 shorted).
f) Replace the display board and all panels.

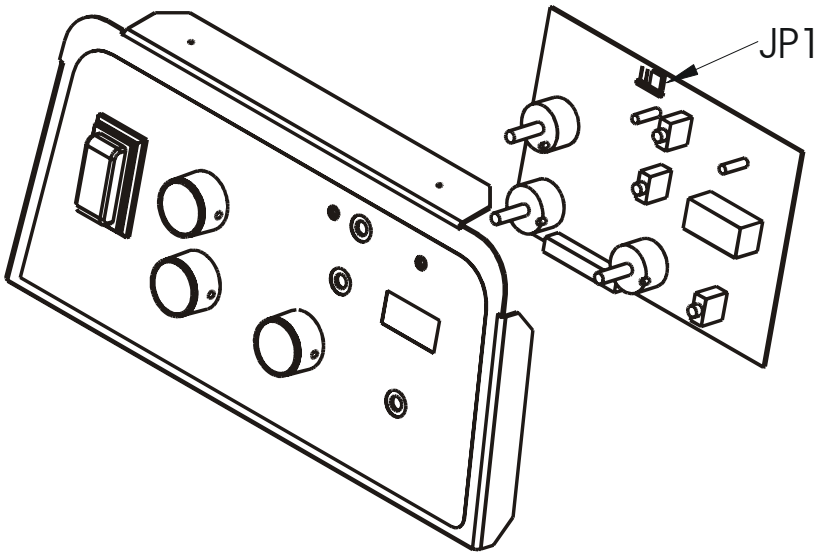


Figure 11 – Enable / Disable Wire Sharpening in GMAW mode

14. Basic Welding Technique GMAW

14.1 Setting of the Power Source

The setting of the TRANSMIG 500i for the GMAW process requires some practice by the operator, the welding Power Source having two control settings that have to balance. These are the Wire speed control and the Voltage Control. The welding current is determined by the Wire speed control, the current will increase with increased Wire speed, resulting in a shorter arc. Less wire speed will reduce the current and lengthen the arc. Increasing the welding voltage hardly alters the welding current level, but lengthens the arc. By decreasing the voltage, a shorter arc is obtained with little change in welding current.

When changing to a different electrode wire diameter, different control settings are required. A thinner electrode wire needs more Wire speed to achieve the same current level.

A satisfactory weld cannot be obtained if the wire speed and voltage settings are not adjusted to suit the electrode wire diameter and dimensions of the work-piece.

If the Wire speed is too high for the welding voltage, "stubbing" will occur as the wire dips into the molten pool and does not melt. Welding in these conditions normally produces a poor weld due to lack of fusion. If, however, the welding voltage is too high, large drops will form on the end of the electrode wire, causing spatter. The correct setting of voltage and Wire speed can be seen in the shape of the weld deposit and heard by a smooth regular arc sound.

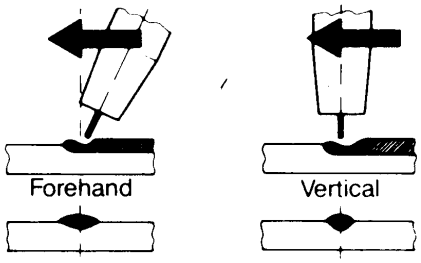


Figure 12 – MIG Torch angle

14.2 Position of MIG Torch

The angle of MIG torch to the weld has an effect on the width of the weld run. Refer to Figure 12.

14.3 Distance from the MIG Torch Nozzle to the Work Piece

The electrode stick out from the MIG Torch nozzle should be between 2.0mm (5/64") to 5.0mm. (13/64") This distance may vary depending on the type of joint that is being welded.

14.4 Travel Speed

Speed at which a weld travels influences the width of the weld and penetration of the welding run.

14.5 Electrode Wire Size Selection

The choice of electrode wire size in conjunction with shielding gas used depends on:

a) Thickness of the metal to be welded,
b) Type of joint,
c) Capacity of the wire feed unit and power Source,
d) The amount of penetration required,
e) The deposition rate required,
f) The bead profile desired,
g) The position of welding and
h) Cost of the electrode wire.

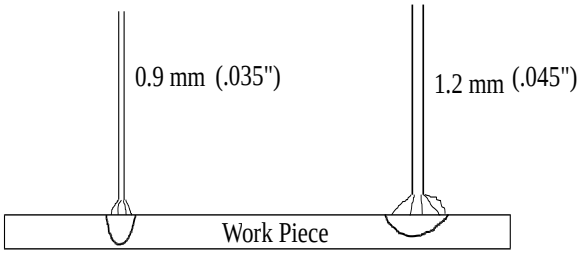
Weld metal deposition rate is proportional to current density. Current density is defined as the current per cross sectional area of the electrode wire and is normally expressed as amps per mm^2.

An example is tabled below

Electrode Wire Size	Current	Current Density (Amps/mm^2)	Deposition Rate (kg/hour)
0.9mm (.035")	200A	314	3.2
1.2mm (.045")	200A	177	2.8

Table 6 – 0.9mm (.035")/1.2mm (.045") wire deposition rate

This demonstrates that where the upper limit of current is limited by machine capacity and duty cycle, higher deposition rates and therefore greater productivity will be achieved by using smaller electrode wire. The TRANSMIG 500i is a particularly efficient MIG welder with the 0.9mm steel wire in spray transfer mode. The savings from decreased welding time will more than cover the small cost penalty of the smaller electrode wire sizes. (0.9mm (.035") wire cost approx. 10% more than 1.2mm (.045"), but is deposited approx. 15% faster).



Penetration comparison using the same current (200A) for both electrodes

Figure 13 – Wire penetration comparison

Higher current density (or smaller diameter wire) also gives deeper penetration as shown Figure 13.

15. Basic Welding Technique MMAW

15.1 Setting of the Power Source

The setting of the TRANSMIG 500i for the MMAW process is more straightforward. The Welding Power Source has only two control settings. These are the Arc Force control and the Current Control. These should be set according to the size and type of Stick Electrode being used.

Touch the electrode on the work piece and commence welding. If necessary, readjust the current and/or arc force control knob(s) to obtain the welding condition required

15.2 Position of Electrode Holder

The angle of electrode holder to the weld has an effect on the width of the weld run.

Refer to Figure 14

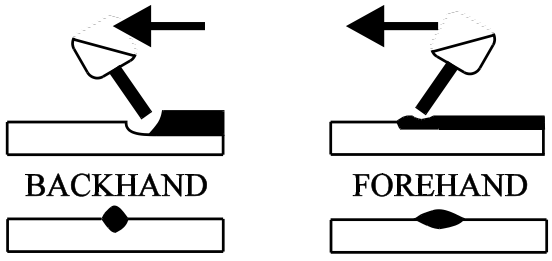


Figure 14 – Electrode angle

15.3 Travel Speed

Speed at which a weld travels influences the width of the weld and penetration of the welding run.

15.4 Electrode Size Selection

The choice of Electrode size depends on:

a) Thickness of the metal to be welded,
b) Type of joint,
c) The amount of penetration required,
d) The deposition rate required,
e) The bead profile desired,
f) The position of welding.
g) Cost of the electrode.

15.5 Electrode Polarity

Stick electrodes are generally connected to the POSITIVE (+) terminal and the work lead to the NEGATIVE (-) but if in doubt consult the electrode manufacturers literature.

15.6 Effects of Stick Welding Various Materials

a) High tensile and alloy steels
The two most prominent effects of welding these steels are the formation of a hardened zone in the weld area, and, if suitable precautions are not taken, the occurrence in this zone of under-bead cracks. Hardened zone and under-bead cracks in the weld area may be reduced by using the correct electrodes, preheating, using higher current settings, using larger electrodes sizes, short runs for larger electrode deposits or tempering in a furnace.

b) Manganese steels
The effect on manganese steel of slow cooling from high temperatures is to embrittle it. For this reason it is absolutely essential to keep manganese steel cool during welding by quenching after each weld or skip welding to distribute the heat.

c) Cast Iron
Most types of cast iron, except white iron, are weldable. White iron, because of its extreme brittleness, generally cracks when attempts are made to weld it. Trouble may also be experienced when welding white-heart malleable, due to the porosity caused by gas held in this type of iron.

16. Basic Welding Technique GTAW

16.1 Setting of the Power Source

The setting of the TRANSMIG 500i for the GTAW process similar to the setup for MMAW. The Welding Power Source has only one control setting. This is the Current Control. This should be set according to the size of the Tungsten Electrode being used.

Gently rest the torch cup on the work-piece. Press the trigger (if a trigger is being used). Rock the torch until the tungsten briefly touches the work-piece. Lift or rock the tungsten back off the work to initiate the arc. During the time the tungsten is touching the work, the

Power Source will automatically limit the weld current to 20A. Once the arc is initiated, the welding current will change to the preset value (or remote control value). To minimise the heating of the end of the tungsten, it should be left in contact with the work-piece only briefly. If necessary readjust the current control knob to obtain the welding condition required.

16.2 Position of the TIG torch

The angle of the TIG torch to the weld has an effect on the width of the weld run.

Refer to Figure 15

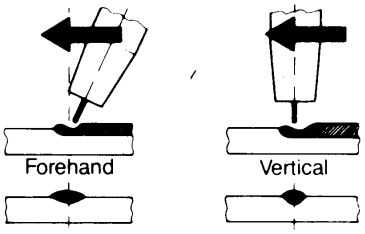


Figure 15 – TIG torch angle

16.3 Distance from the TIG torch to the Work Piece

The tip of the torch should be between 2.0mm (5/64") to 5.0mm (13/64") This distance may vary depending on the type of joint that is being welded.

16.4 Travel Speed

Speed at which a weld travels influences the width of the weld and penetration of the welding run.

16.5 Electrode Size Selection

The choice of Electrode size depends on:

a) Thickness of the metal to be welded,
b) Type of joint,
c) The amount of penetration required,
d) The deposition rate required,
e) The bead profile desired,
f) The position of welding.

16.6 Electrode Polarity

Connect the TIG torch to the NEGATIVE (–) terminal and the work lead to the POSITIVE (+) terminal for direct current straight polarity.
Direct current (DC+) straight polarity is the most widely used polarity for DC TIG welding. It allows limited wear of the electrode since 70% of the heat is concentrated at the work piece.

16.7 Tungsten Electrode Current Ranges

Electrode Diameter (mm)	Constant Current (A)
1.0	2 - 30
1.6	8 - 70
2.4	12 - 150
3.2	20 - 250

Table 7 – Current ranges for various tungsten electrode sizes

16.8 Tungsten Electrode Types

Electrode Type (Ground Finish)	Welding Application	Features	Colour Code
Thoriated 2%	DC welding of mild steel, stainless steel and copper.	Excellent arc starting, Long life, High current carrying capacity.	Red
Zirconated 1% (see Note below)	High quality AC welding of aluminium, magnesium and their alloys.	Self cleaning, Long life, Maintains balled end, High current carrying capacity.	White
Ceriated 2% (see Note below)	AC & DC welding of mild steel, stainless steel, copper, aluminium, magnesium and their alloys	Longer life, More stable arc, Easier starting, Wider current range, Narrower more concentrated arc.	Grey

Table 8 – Tungsten electrode types

NOTE 4

The TRANSMIG 500i is a DC welding power source and is NOT designed for AC welding of Aluminium, Magnesium and their alloys. The information on AC Electrodes in table 6 is for reference only.

16.9 Guide for Selecting Filler Wire Diameter

Welding Current (A)	Filler Wire Diameter. (mm∅). (Refer Note below).
10 - 20	1.2
20 - 50	1.2 - 1.6
50 - 100	1.6 - 2.4
100 - 200	1.6 - 3.2

Table 9 – GTAW Filler Wire

NOTE 5

Filler wire specified in Table 9is a guide only, other wires may be used according to the welding application

16.10Shielding Gas Selection

Alloy	Shielding Gas
Aluminium & alloys	Welding Argon or Argon/Helium Mixtures
Carbon Steel	Welding Argon
Stainless Steel	Welding Argon or Argon/Helium Mixtures or Argon/Helium/Hydrogen Mixtures
Nickel Alloy	Welding Argon or Argon/Helium/Hydrogen Mixtures
Copper	Welding Argon or Argon/Helium Mixtures
Titanium	Welding Argon or Argon/Helium Mixtures

Table 10 – GTAW Shielding Gas Selection

16.11TIG Welding Parameters for Stainless Steel

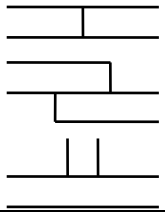
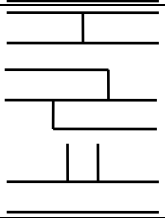
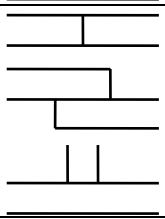
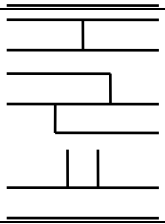
Base Metal Thickness	Current Range DC Amperes	Travel Speed mm/min.	Argon Gas Flow Rate Litres/min.	Joint Type
1.0 mm	30 - 50	150 - 400	5	
1.5 mm	50 - 90	150 - 350	6	
3.0 mm	100 - 150	100 - 250	7	
4.0 mm	140 - 220	100 - 250	8	

Table 11 – TIG welding parameters for stainless steel

17. Basic Welding Technique CAG

17.1 Setting of the Power Source

The setting of the TRANSMIG 500i for the CAG process similar to the setup for MMAW. The Welding Power Source has only one control setting. This is the Current Control. This should be set according to the size of the Gouging Electrode being used.

Connect the air hose from the Carbon Arc Gouging Torch to a Filtered, Industrial, Compressed air outlet and set pressure to the Carbon Arc Gouging Torch manufacturers specification.

Touch the carbon arc electrode on the work piece and commence gouging. If necessary readjust the current control knob to obtain the welding condition required.

17.2 Carbon Arc Electrode Size Selection

Refer to the Carbon Arc Electrode manufacturers literature.

17.3 Carbon Arc Electrode Polarity

Refer to the Carbon Arc Electrode manufacturers literature.

18. Routine Maintenance & Inspection

The only routine maintenance required for the TRANSMIG 500i is a thorough cleaning and inspection, with the frequency depending on the usage and the operating environment.

WARNING 10

Disconnect the TRANSMIG 500i from the Mains supply voltage before disassembling.

Special maintenance is not necessary for the control unit parts in the Power Source. If these parts are damaged for any reason, replacement is recommended.

CAUTION 7

Do not blow air into the Power Source during cleaning. Blowing air into the Power Source can cause metal particles to interfere with sensitive electronic components and cause damage to the Power Source.

To clean the Power Source, disconnect it from the mains supply voltage then open the enclosure and use a vacuum cleaner to remove any accumulated dirt and dust. The Power Source should also be wiped clean. If necessary, solvents that are recommended for cleaning electrical apparatus may be used.

Troubleshooting and repairing the TRANSMIG 500i should be carried out only by those who are familiar with electrical equipment.

WARNING 11

Do not attempt to diagnose or repair unless you have had training in electronic measurement and troubleshooting techniques.

19. Basic Troubleshooting

The basic level of troubleshooting is that which can be performed without special equipment or knowledge, and without removing the covers from the Power Source.

If major components are faulty, then the Power Source should be returned to an Accredited CIGWELD Service Provider for repair.

19.1 Solving Problems Beyond the Welding Terminals GMAW

The general approach to fix Gas Metal Arc Welding (GMAW) problems is to start at the wire spool then work through to the MIG torch. There are two main areas where problems occur with GMAW:

a) Porosity

When there is a gas problem the result is usually porosity within the weld metal. Porosity always stems from some contaminant within the molten weld pool which is in the process of escaping during solidification of the molten metal.

Contaminants range from no gas around the welding arc to dirt on the work piece surface. Porosity can be reduced by checking the following points:

1. Gas cylinder contents and flow meter.	- Ensure that the gas cylinder is not empty and the flow meter is correctly adjusted to 15 litres per minute.
2. Gas leaks.	- Check for gas leaks between the regulator/cylinder connection and in the gas hose to the Power Source.
3. Internal gas hose in the Power Source.	- Ensure the hose from the solenoid valve to the MIG torch adaptor has not fractured and that it is connected to the MIG torch adaptor.
4. Welding in a windy environment.	- Shield the weld area from the wind or increase the gas flow.
5. Welding dirty, oily, painted, oxidised or greasy plate.	- Clean contaminates off the plate
6. Distance between the MIG torch nozzle and the work piece.	- Keep the distance between the MIG torch nozzle and the work piece to a minimum. Refer to section 14.3 on page 34.
7. Maintain the MIG torch in good working order.	- Ensure that the gas holes are not blocked and gas is exiting out of the torch nozzle. Do not restrict gas flow by allowing spatter to build up inside the MIG torch nozzle. Check that the MIG torch O-rings are not damaged.

WARNING 12

Disengage the Wire Feeder drive roll when testing for gas flow by ear.

b) Inconsistent wire feed
Wire feeding problems can be reduced by checking the following points:

1. Wire spool brake is too tight.	- Feed roller driven by motor in the cabinet will slip.
2. Wire spool brake is too loose.	- Wire spool can unwind and tangle.
3. Worn or incorrect feed roller size.	- Use 'U' groove drive feed roller matched to the aluminium wire size you are welding. Use 'V' groove drive feed roller matched to the steel wire size you are welding. Use 'knurled V' groove drive feed roller matched to the flux cored wire size you are welding.
4. Mis-alignment of inlet/outlet guides.	- Wire will rub against the mis-aligned guides and reduces wire feedability.
5. Liner blocked with swarf.	- Swarf is produced by the wire passing through the feed roller, if excessive pressure is applied to the pressure roller adjuster. Swarf can also be produced by the wire passing through an incorrect feed roller groove shape or size. Swarf is fed into the liner where it accumulates thus reducing wire feedability.
6. Incorrect or worn contact tip.	- The contact tip transfers the weld current to the electrode wire. If the hole in the contact tip is to large then arcing may occur inside the contact tip resulting in the electrode wire jamming in the contact tip. When using soft electrode wire such as aluminium it may become jammed in the contact tip due to expansion of the wire when heated. A contact tip designed for soft electrode wires should be used.
7. Poor work lead contact to work piece.	- If the work lead has a poor electrical contact to the work piece then the connection point will heat up and result in a reduction of power at the arc.
8. Bent liner.	- This will cause friction between the wire and the liner thus reducing wire feedability

19.2 Welding Problems GMAW

FAULT	CAUSE	REMEDY
1 Undercut.	A Welding arc voltage too high.	A Reduce voltage by reducing the voltage selection switches position or increase the wire feed speed.
	B Incorrect torch angle	B Adjust angle
	C Excessive heat input	C Increase the torch travel speed and/or reduce welding current by reducing the voltage selection switches position or reducing the wire feed speed.
2 Lack of penetration.	A Welding current too low	A Increase welding current by increasing wire feed speed and increasing voltage selection switch position.
	B Joint preparation too narrow or gap too tight	B Increase joint angle or gap
	C Shielding gas incorrect	C Change to a gas which gives higher penetration
3 Lack of fusion.	Voltage too low	Increase voltage by increasing voltage selection switches position.
4 Excessive spatter.	A Voltage too high	A Lower voltage by reducing the voltage selection switches or increase wire speed control.
	B Voltage too low	B Raise voltage by increasing the voltage selection switches or reduce wire speed control.
5 Irregular weld shape.	A Incorrect voltage and current settings. Convex, voltage too low. Concave, voltage too high.	A Adjust voltage and current by adjusting the voltage selection switches and the wire speed control.
	B Wire is wandering	B Replace contact tip
	C Incorrect shielding gas	C Check shielding gas.
	D Insufficient or excessive heat input	D Adjust the wire speed control or the voltage selection switches.
6 Weld cracking.	A Weld beads too small	A Decrease travel speed
	B Weld penetration narrow and deep	B Reduce current and voltage and increase MIG torch travel speed or select a lower penetration shielding gas.
	C Excessive weld stresses	C Increase weld metal strength or revise design
	D Excessive voltage	D Decrease voltage by reducing the voltage selection switches.
	E Cooling rate too fast	E Slow the cooling rate by preheating part to be welded or cool slowly.

Welding Problems GMAW (continued)

FAULT	CAUSE	REMEDY
7 Cold weld puddle.	A Faulty rectifier unit	A Have an Accredited CIGWELD Service Provider to test then replace the faulty component.
	C Loose welding cable connection.	C Check all welding cable connections.
	D Low Primary Voltage	D Contact supply authority
8 Arc does not have a crisp sound that short arc exhibits when the wirefeed speed and voltage are adjusted correctly.	The MIG torch has been connected to the wrong voltage polarity on the front panel.	Connect the MIG torch to the positive (+) welding terminal for solid wires and gas shielded flux cored wires. Refer to the electrode wire manufacturer for the correct polarity.

Table 12 – Welding Problems GMAW

19.3 Welding Problems GTAW

FAULT	CAUSE	REMEDY
1 Electrode melts & oxidises when an arc is struck.	A Torch lead connected to positive welding terminal.	A Connect Torch lead to negative welding terminal.
	B No gas flowing to welding region.	B Check the gas lines for kinks or breaks and gas cylinder contents.
	C Torch is clogged with dust or dirt.	C Clean torch.
	D Gas hose is cut.	D Replace gas hose.
	E Gas passage contains impurities.	E Disconnect gas hose from the rear of Power Source then raise gas pressure and blow out impurities.
	F Gas regulator turned off.	F Turn on.
	G Torch valve is turned off.	G Turn on.
	H The electrode is too small for the welding current.	H Increase electrode diameter or reduce the welding current.
	I Power source is set for MIG welding	I Set Power source to STICK/TIG mode.
2 Dirty weld pool.	A Electrode contaminated by contact with work piece or filler rod material.	A Clean the electrode by grinding off the contaminates.
	B Work piece surface has foreign material on it.	B Clean surface.
3 Poor weld finish.	Inadequate shielding gas.	Increase gas flow or check gas line for gas flow problems.

Welding Problems GTAW (continued)

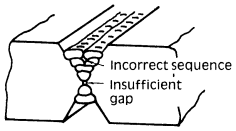
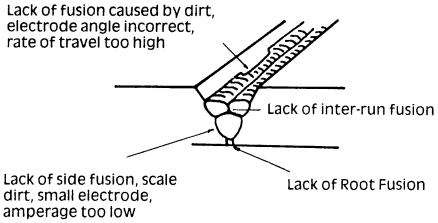
FAULT	CAUSE	REMEDY
4 Arc start is not smooth.	A Tungsten electrode is too large for the welding current.	A Select the right size electrode. Refer to Table 5.
	B The wrong electrode is being used for the welding job.	B Select the right electrode type. Refer to Table 6.
	C Gas flow rate is too high.	C Select the right rate for the welding job. Refer to Table 10.
	D Incorrect shielding gas is being used.	D Select the right shielding gas. Refer to Table 8.
	E Poor work clamp connection to work piece.	E Improve connection to work piece.
5 A hole is produced in the work piece when an arc is struck.	Hot start control is set too high.	Reduce.

Table 13 – Welding Problems GTAW

19.4 Welding Problems MMAW

FAULT	CAUSE	REMEDY
1 Welding current varying.	*ARC FORCE* control knob is set at a value that causes the welding current to vary excessively with the arc length.	Reduce the *ARC FORCE* control knob until welding current is reasonably constant while prohibiting the electrode from sticking to the work piece when you "dig" the electrode into the work piece.
2 A gap is left by failure of the weld metal to fill the root of the weld.	A Welding current is too low.	A Increase welding current
	B Electrode too large for joint.	B Use smaller diameter electrode.
	C Insufficient gap.	C Allow wider gap.
3 Non-metallic particles are trapped in the weld metal.	A Non-metallic particles may be trapped in undercut from previous run.	A If a bad undercut is present, clean slag bout and cover with a run from a smaller gauge electrode.
	B Joint preparation too restricted.	B Allow for adequate penetration and room for cleaning out the slag.
	C Irregular deposits allow slag to be trapped.	C If very bad, chip or grind out irregularities.
	D Lack of penetration with slag trapped beneath weld bead.	D Use smaller electrode with sufficient current to give adequate penetration. Use suitable tools to remove all slag from corners.

Welding Problems MMAW (continued)

FAULT	CAUSE	REMEDY
3 Non-metallic particles are trapped in the weld metal.	E Rust or mill scale is preventing full fusion. F Wrong electrode for position in which welding is done.	E Clean joint before welding. F Use electrodes designed for position in which welding is done, otherwise proper control of slag is difficult.
 Figure 16 – Example of insufficient gap or incorrect sequence		
4 A groove has been formed in the base metal adjacent to the toe of a weld and has not been filled by the weld metal (Undercut).	A Welding current is too high. B Welding arc is too long. C Angle of the electrode is incorrect. D Joint preparation does not allow correct electrode angle. E Electrode too large for joint. F Insufficient deposit time at edge of weave. G Power source is set for MIG welding	A Reduce welding current B Reduce the length of the welding arc. C Electrode should not be inclined less than 45° to the vertical face D Allow more room in joint for manipulation of the electrode. E Use smaller gauge electrode. F Pause for a moment at edge of weave to allow weld metal build-up. G Set Power source to STICK mode.
5 Portions of the weld run do not fuse to the surface of the metal or edge of the joint.	A Small electrodes used on heavy cold plate. B Welding current is too low. C Wrong electrode angle. D Travel speed of electrode is too high. E Scale or dirt on joint surface.	A Use larger electrodes and pre-heat the plate. B Increase welding current C Adjust angle so the welding arc is directed more into the base metal. D Reduce travel speed of electrode E Clean surface before welding.
 Figure 17 – Example of lack of fusion		

Welding Problems MMAW (continued)

	FAULT	CAUSE	REMEDY
6	Gas pockets or voids in weld metal (porosity)	A High levels of sulphur in steel. B Electrodes are damp. C Welding current is too high. D Surface impurities such as oil, grease, paint, etc. E Welding in a windy environment. F Electrode damaged ie flux coating incomplete.	A Use an electrode that is designed for high sulphur steels. B Dry electrodes before use. C Reduce welding current. D Clean joint before welding. E Shield the weld area from the wind. F Discard damaged electrodes and only use electrodes with a complete flux coating.
7	Crack occurring in weld metal soon after solidification commences	A Rigidity of joint. B Insufficient throat thickness. C Weld current is too high.	A Redesign to relieve weld joint of severe stresses or use crack resistance electrodes. B Travel slightly slower to allow greater build up in throat C Decrease welding current.
8	A hole is produced in the work piece when an arc is struck.	Hot start control is set too high.	Reduce

Figure 18 – Examples of slag inclusion

Table 14 – Welding Problems MMAW

19.5 Power Source / Wirefeeder Problems

	FAULT	CAUSE	REMEDY
1	Mains supply voltage is ON and Indicator light is lit but when the torch trigger switch is depressed nothing happens.	Torch trigger switch leads are disconnected.	Reconnect.
2	Mains supply voltage is ON, no wire feed but gas flows from the MIG Torch when the torch trigger switch is depressed.	A Electrode wire stuck in conduit liner or contact tip (burn-back jam). B Faulty control PCB	A Check for clogged / kinked MIG Torch conduit or worn contract tip. Replace faulty component(s). B Have an Accredited CIGWELD Service Provider investigate the fault.

Power Source / Wirefeeder Problems (continued)

FAULT	CAUSE	REMEDY
3 Wire feeds when the torch trigger switch is depressed but arc can not be established.	Poor or no work lead connection.	Clean work clamp area and ensure good electrical contact.
4 Wire continues to feed when the torch trigger switch is released.	The Mode Selector Switch has been set to 4T (latch operation).	Set the Mode Selector Switch has been set to 2T (normal operation).
5 Jerky wire feed	A Worn or dirty contact tip B Worn feed roll. C Excessive back tension from wire reel hub. D Worn, kinked or dirty conduit liner	A Replace B Replace C Reduce brake tension on spool hub D Clean or replace conduit liner
6 No gas flow	A Gas hose is cut. B Gas passage contains impurities. C Gas regulator turned off.	A Replace or repair. B Disconnect gas hose from the rear of wirefeeder then raise gas pressure and blow out the impurities. C Turn on.
7 Gas flow continues after the torch trigger switch has been released.	Gas valve has jammed open due to impurities in the gas or the gas line.	Have an Accredited CIGWELD Service Provider repair or replace gas valve.

Table 15 – Power Source / Wirefeeder Problems

20. Advanced Troubleshooting

WARNING 13

There are extremely dangerous and lethal voltages and power levels present inside this product. Do not attempt to open or repair the Power Source unless you are an Accredited CIGWELD Service Provider and you have had training in power measurements and troubleshooting techniques.

If major complex subassemblies are faulty, then the Welding Power Source must be returned to an Accredited CIGWELD Service Provider for repair.

The Advanced level of troubleshooting is that which can be performed only with special equipment and knowledge, and involving removal of the covers from the Power Source.

20.1 Power Source Problems

FAULT	CAUSE	REMEDY
1 Mains supply voltage is ON. Digital meter if off and welding arc can not be established. .	A Primary fuse is blown.	A Replace primary fuse.
	B Broken connection in primary circuit.	B Have an Accredited CIGWELD Service Provider check primary circuit.
	C Voltage links not set correctly	C Correct voltage links
	D Control POWER switch is OFF	D Turn switch ON
	E Control POWER switch is faulty	E Have an Accredited CIGWELD Service Provider replace the switch
	F Possibly defective main control board or display board	F Have an Accredited CIGWELD Service Provider replace the board(s)
2 Power Source blows input fuse as soon as power is applied	A Incorrect input wiring	A Correct input wiring
	B Voltage links not set correctly	B Correct voltage links
	C Control fuse blown	C Replace
	D Internal wiring to terminal block, input rectifier, IGBT's, contactors or changeover board faulty	D Have an Accredited CIGWELD Service Provider repair the wiring
	E Possible defective input rectifier, suppressor, IGBT, or capacitor board	E Have an Accredited CIGWELD Service Provider replace the components(s) / board(s)
3 Power Source powers up but fans do not run	A Control switch is OFF	A Turn switch ON
	B No 120VAC on rear outlet	B Replace 20A fuse on rear panel
	C Faulty wiring	C Have an Accredited CIGWELD Service Provider repair the wiring to fans or main control board J9

Power Source Problems (continued)

FAULT	CAUSE	REMEDY
3 Power Source powers up but fans do not run	D Defective main control pcb	D Have an Accredited CIGWELD Service Provider replace pcb
	E Possible faulty fan(s)	E Have an Accredited CIGWELD Service Provider replace the fan(s)
4 Control Power circuit breaker trips OFF	A Short on the 120VAC rear outlets or 14 / 19 pin receptacles	A Repair the external short circuit
	B Internal short circuit	B Have an Accredited CIGWELD Service Provider check and repair wiring to both contactors, fans, main pcb, rear 120VAC outlets, 14 / 19 pin receptacles and small control transformer
	C Defective main circuit breaker	C Have an Accredited CIGWELD Service Provider replace the circuit breaker
	D Defective control / auxiliary transformer	D Have an Accredited CIGWELD Service Provider replace the control / auxiliary transformer
5 Power Source powers up but no output or incorrect output	A Check open circuit voltage is correct	A Open Circuit Voltage should be between 55 – 70VDC
	B Shorted Output Diode	B Have an Accredited CIGWELD Service Provider replace diode
	C Check front panel controls are correct	C Set Remote / Local to Remote Check range of main control GTAW 5 – 560Amps MMAW 5 – 560Amps CAG 5 – 560Amps GMAW 10-44Volts Check contactor control When the contactor is ON the indicator LED should be ON. When the contactor is ON there should be open circuit voltage on the output terminals
	D Defective main control pcb	D Have an Accredited CIGWELD Service Provider replace pcb
	E Defective IGBT or input rectifier	E Have an Accredited CIGWELD Service Provider replace the IGBT or input rectifier
	F Possible faulty wiring to current sensor, or faulty current sensor	F Have an Accredited CIGWELD Service Provider check wiring to the current sensor, or replace faulty current sensor

Table 16 – Power Source Problems

20.2 How to test the input rectifier module

See figure 19 below and / or connection diagram. Check all 6 diodes with the diode check range on a digital multimeter. All diodes should read between 0.3V to 0.6V

Ensure power Source power is off and isolated. Ensure capacitor banks are discharged before proceeding with this test.

a) Positive meter lead on AC terminal A(1), negative meter lead on (+) terminal D(4)
b) Positive meter lead on AC terminal B(2), negative meter lead on (+) terminal D(4)
c) Positive meter lead on AC terminal C(3), negative meter lead on (+) terminal D(4)
d) Positive meter lead on (-) terminal F(5), negative meter lead on AC terminal A(1)
e) Positive meter lead on (-) terminal F(5), negative meter lead on AC terminal B(2)
f) Positive meter lead on (-) terminal F(5), negative meter lead on AC terminal C(3)

20.3 How to test the IGBT module

See figure 19 below and / or connection diagram. Check s with the diode check range on a digital multimeter. All should read between 0.3V to 0.6V

Ensure power Source power is off and isolated. Ensure capacitor banks are discharged before proceeding with this test.

a) Top IGBT. Positive meter lead on terminal C2E1, negative meter lead on terminal C1
b) Top IGBT. Positive meter lead on terminal E2, negative meter lead on terminal C2E1
c) Bottom IGBT. Positive meter lead on terminal C2E1, negative meter lead on terminal C1
d) Bottom IGBT. Positive meter lead on terminal E2, negative meter lead on terminal C2E1

20.4 How to test the Output Diodes

See figure 19 below and / or connection diagram. Check s with the diode check range on a digital multimeter. All should read between 0.2V to 0.6V

Ensure power Source power is off and isolated. Ensure capacitor banks are discharged before proceeding with this test.

a) Disconnect welding cables from the output terminals
b) Measure across output terminals. Positive meter lead on negative (-) output terminal, negative meter lead on positive (+) output terminal

If meter indicates 0.0V then one or more output diodes are short circuit.

20.5 How to test Output Open Circuit Voltage

a) Disconnect welding cables from the output terminals
b) Set the front panel Mode switch to MMAW
c) Set to LOCAL mode and turn Output Contactor switch ON
d) Measure the output terminal voltage. This should be between 55 – 70VDC

20.6 Erratic Arc

a) Check for loose or incorrect polarity connection to electrode and work
b) Check for good gas flow and correct mixture
c) Check the inductance control is set correctly
d) Lower the distance from the torch to the work piece
e) Possible defective main control circuit board

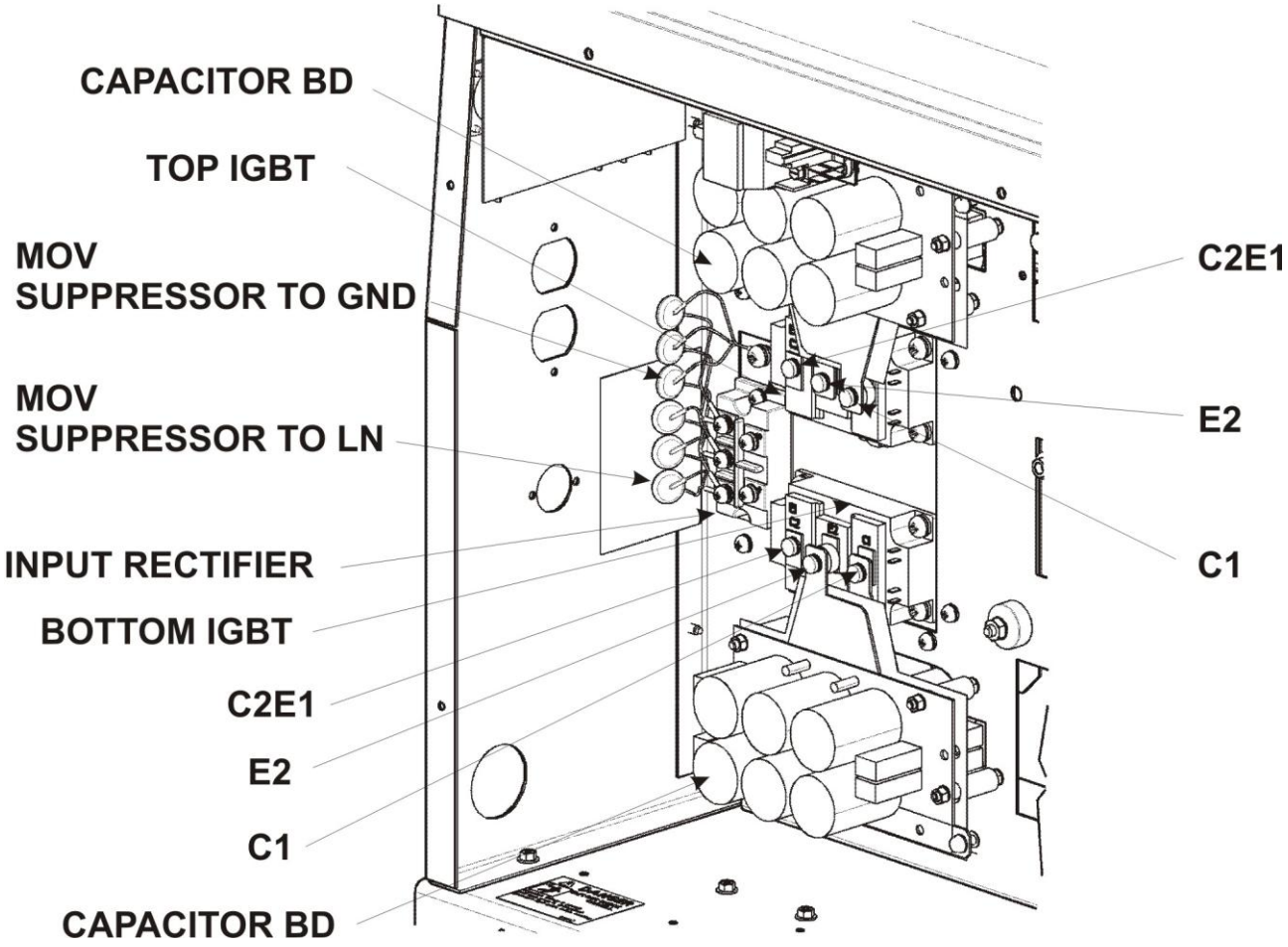


Figure 19 – Internal Power Components

21. Spare Parts

21.1 Panels and Labels

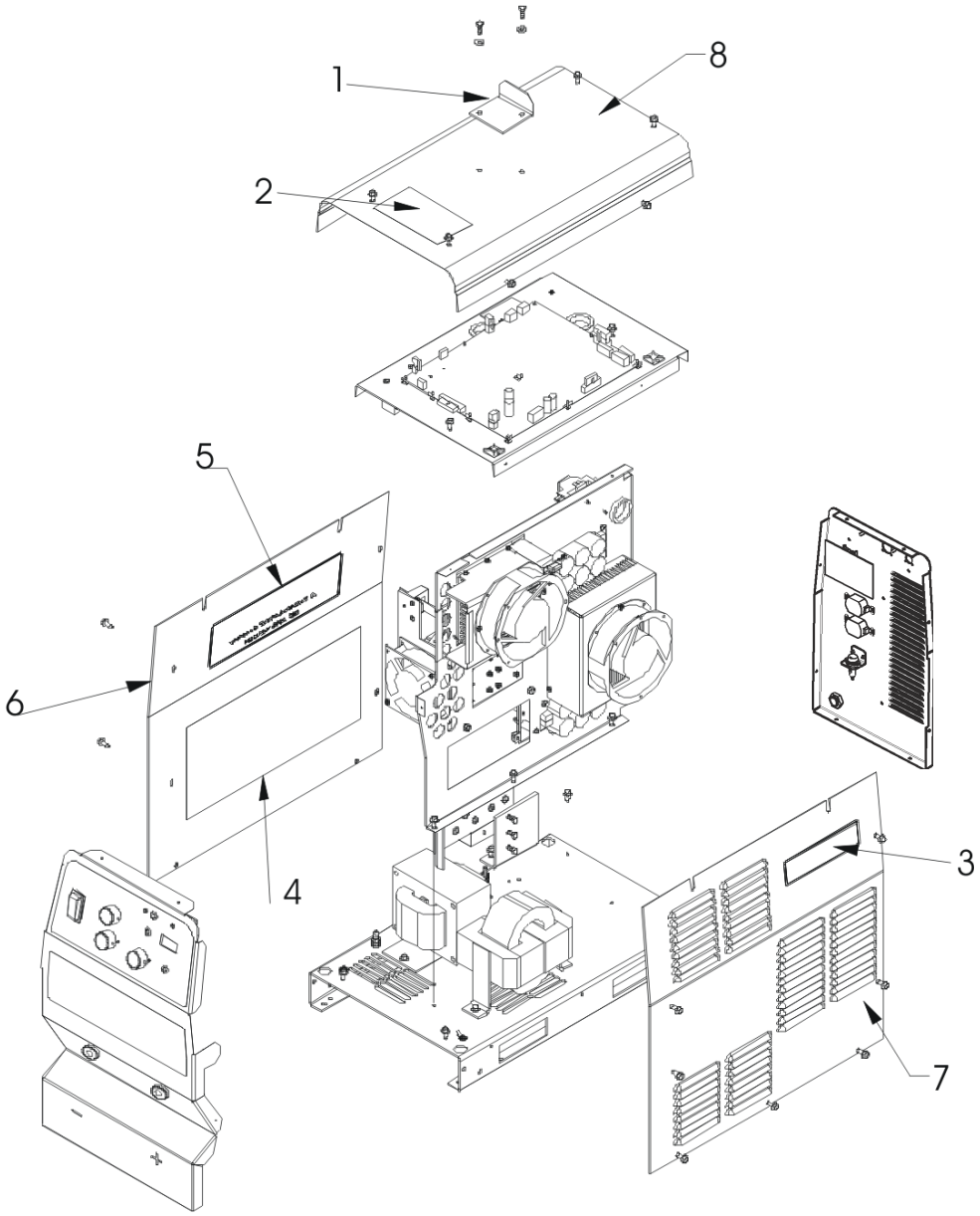


Figure 20 – Panels Sub Assembly

Item	Description	TRANSMIG 500i
1	Bracket Positioning	830348BLU
2	Label Precautionary Static	204036
3	Label Cigweld (small)	706176
4	Label Voltage Changeover	830963
5	Label Cigweld (large)	706177
6	Panel 500i Left Hand Side	830862BLU
7	Panel 500i Right Hand Side	830861BLU
8	Panel 500i Top	830947BLU

21.2 Base Assembly

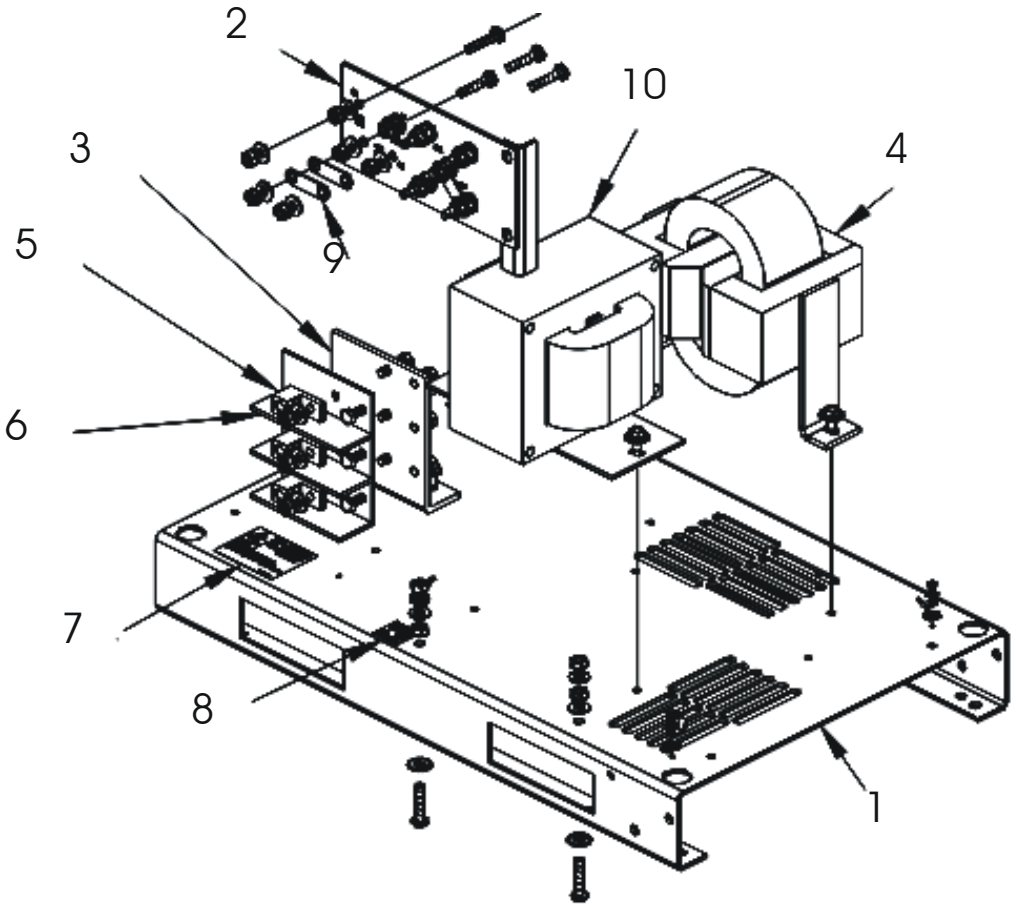


Figure 21 – Base Sub Assembly

Item	Description	TRANSMIG 500i
1	Base	830858
2	Board Changeover	830941
3	Bracket input line	830966
4	Inductor Filter	830942
5	Connector Block (3 required)	830968
6	Insulator Input line (3 required)	830967
7	Label danger shock	830363
8	Label Earth	830116
9	Strap 220/440Volts (3 required)	CW811
10	Transformer Control	830928

21.3 Front Panel Assembly

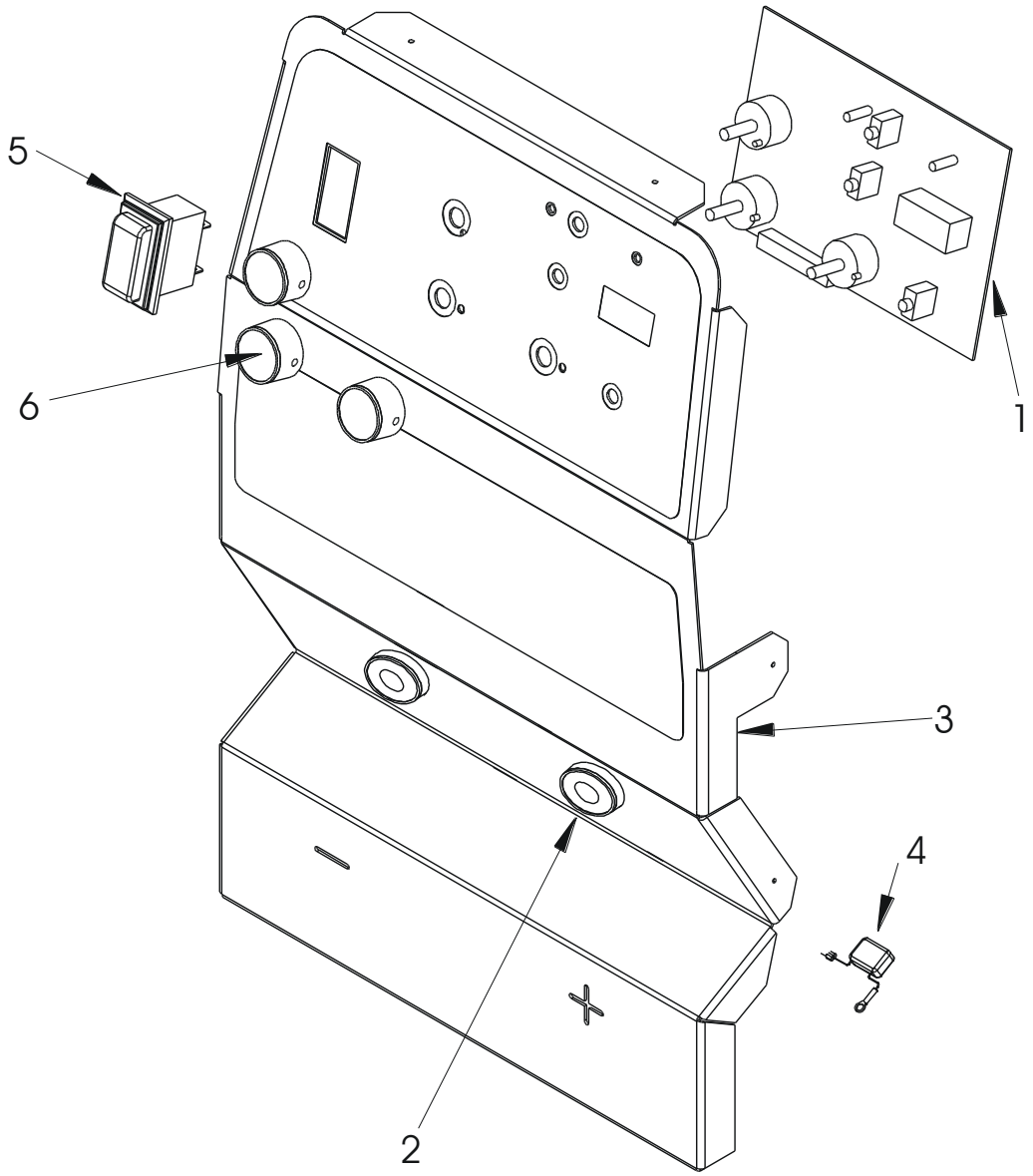


Figure 22 – Front Sub Assembly

Item	Description	TRANSMIG 500i
1	Display circuit board	830906
2	Welding terminal 70mm^2 (2 required)	7977224
3	Panel front	706925
4	Suppressor 0.047uF (2 required)	368705-038
5	Switch / Circuit Breaker 2 pole 10A	830362
6	Knob Control (3 required)	7977709

21.4 Rear Panel Assembly

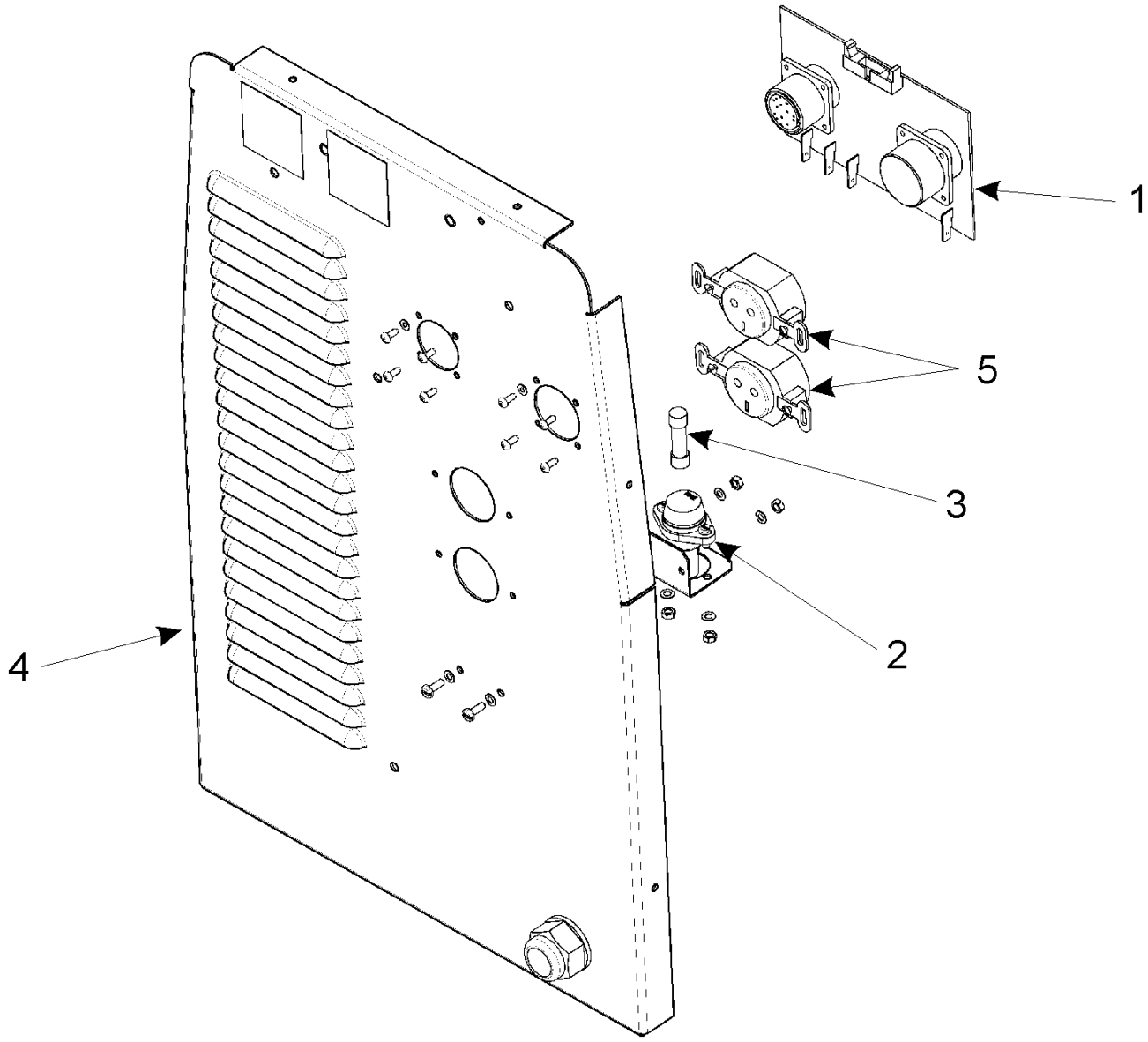


Figure 23 – Rear Sub Assembly

Item	Description	TRANSMIG 500i
1	14 / 19 pin Control interface Circuit Board	830427
2	Fuse Holder	402151
3	Fuse 20A Fast Acting	405083-002
4	Panel Rear	706928
5	120VAC receptacle (2 required)	7975754

21.5 Internal Panel Assembly

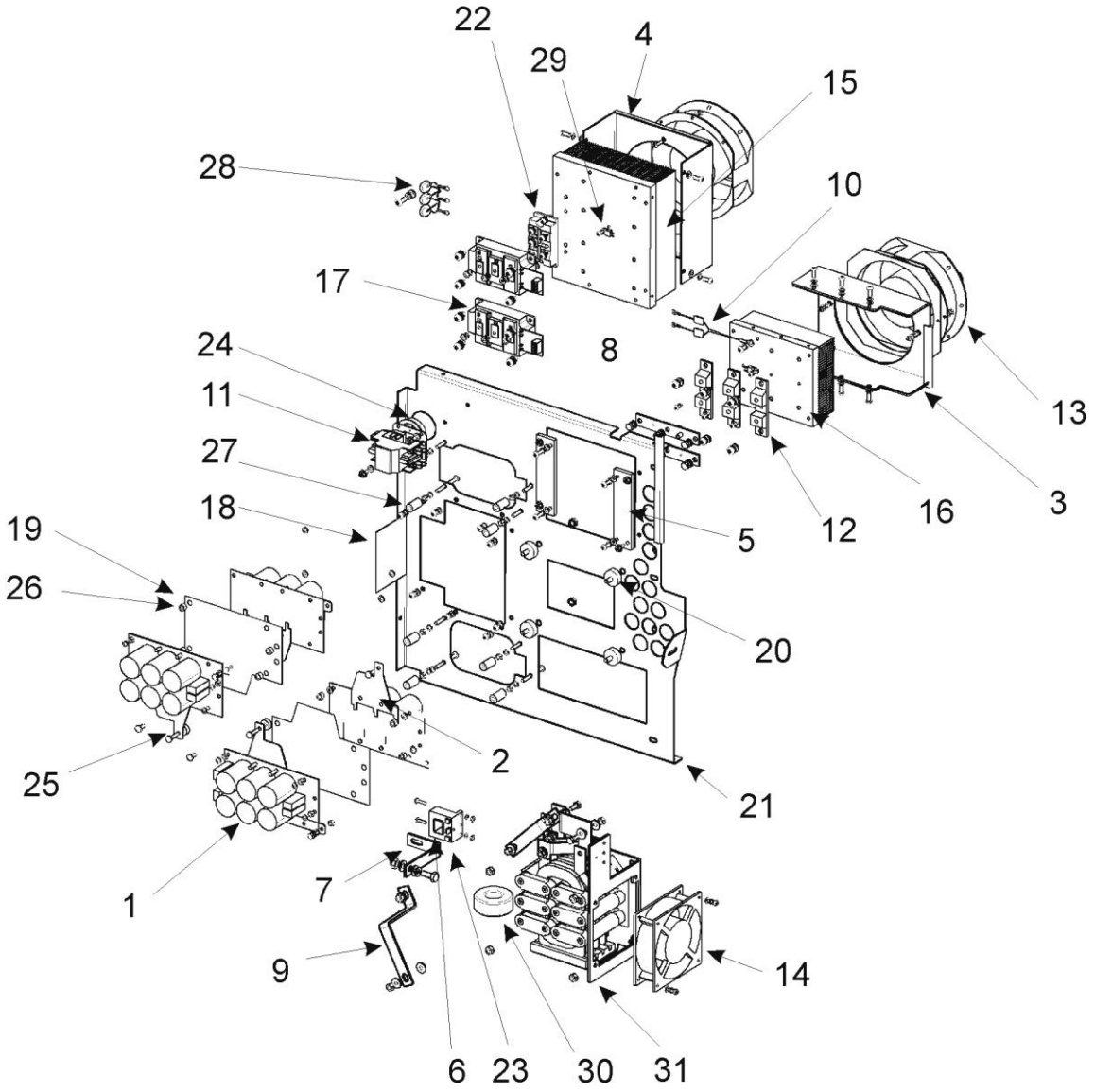


Figure 24 – Internal Sub Assembly

Item	Description	TRANSMIG 500i	Item	Description	TRANSMIG 500i
1	Circuit Board Capacitor Negative (2 req'd)	830413	17	IGBT module assembly (2 req'd)	707730PKD
2	Circuit Board Capacitor Positive (2 req'd)	830414	18	Insulator 3x4	830956
3	Bracket Fan mounting	830606	19	Insulator Nomex (2 req'd)	830369
4	Bracket Mounting	830898	20	Mount Shock – Stud (4 req'd)	830377
5	Bracket Mounting Insulator (2 req'd)	830916	21	Panel Centre	830859
6	Busbar Current Sensor	830918	22	Rectifier 3phase 100A 1600V	830911
7	Busbar Lower Secondary	830915	23	Current Sensor	205018-001
8	Busbar Output Diode (2 req'd)	830917	24	Snap Bushing 1.75" hole	405362-002
9	Busbar Upper Secondary	830914	25	Spacer Brass (2 req'd)	830330
10	Capacitor Snubber	830372	26	Spacer Nylon (8 req'd)	830322
11	Contactor 40A 2 pole	406241-002	27	Spacer Nylon (8 req'd)	830286
12	Diode Ultra Fast	830358	28	Suppressor 1350V 50A (3 req'd)	202258-006
13	Fan 6" (2 req'd)	7978062PKD	29	Thermostat (2 req'd)	830934
14	Fan Transformer	830360	30	Current transformer	830351
15	Heatsink	830897	31	Inverter transformer Power	830912
16	Heatsink Diode Output	830896			

21.6 Internal Control Panel Assembly

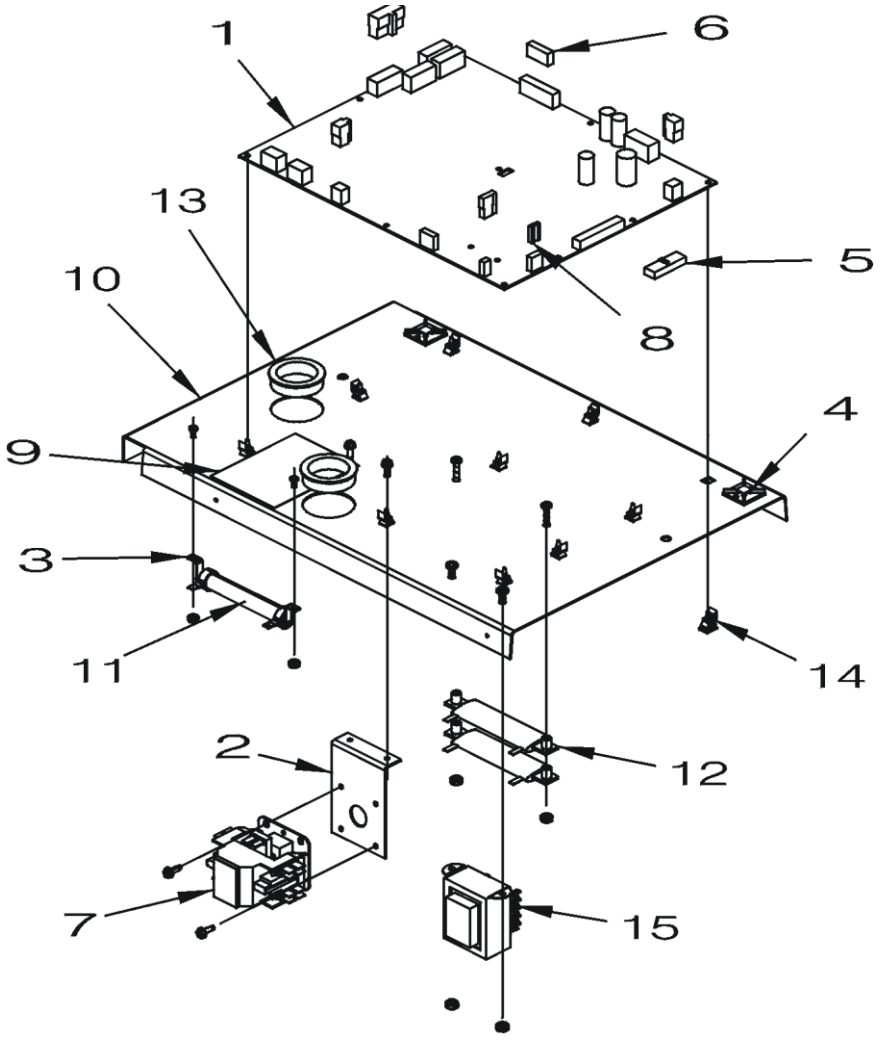


Figure 25 – Internal Control Panel Sub Assembly

Item	Description	TRANSMIG 500i
1	Main Control Circuit Board	830894
2	Bracket Mounting	830285
3	Bracket resistor (2 required)	830395
4	Cable tie mount (2 required)	406006
5	Ribbon Cable 26 pin	204038-002
6	Ribbon Cable 16 pin	204038-012
7	Contactor 30A 2 pole	406240-002
8	Loom Current Sensor	830833
9	Insulator 3x4	830956
10	Panel upper tray	830890
11	Resistor Wound	830394
12	Resistor Wire-wound 55W 10 ohm (2 required)	830345
13	Snap Bushing 1.75 hole (2 required)	405362-002
14	Support Standoff (10 required)	171086-002
15	Transformer Control Small	830336

22. Volt/Amp Graphs

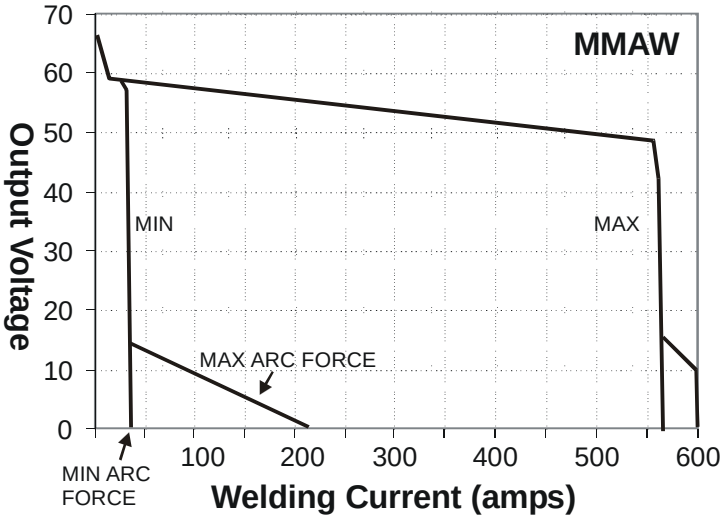


Figure 26 – Volt/Amp curves of the TRANSMIG 500i (MMAW)

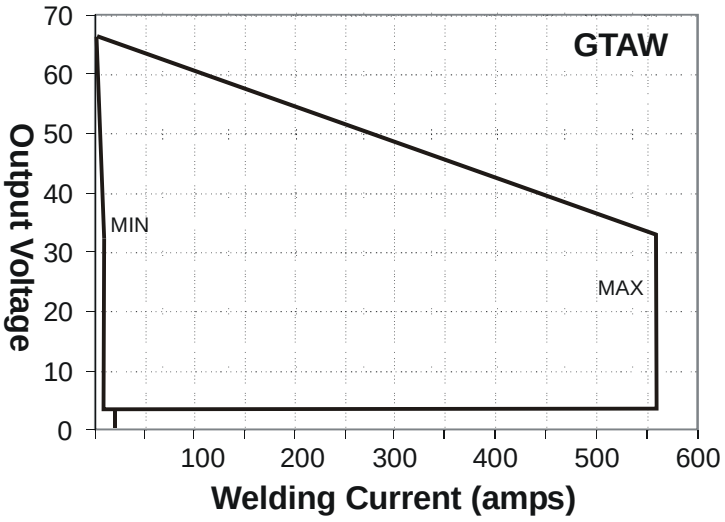


Figure 27 – Volt/Amp curves of the TRANSMIG 500i (GTAW)

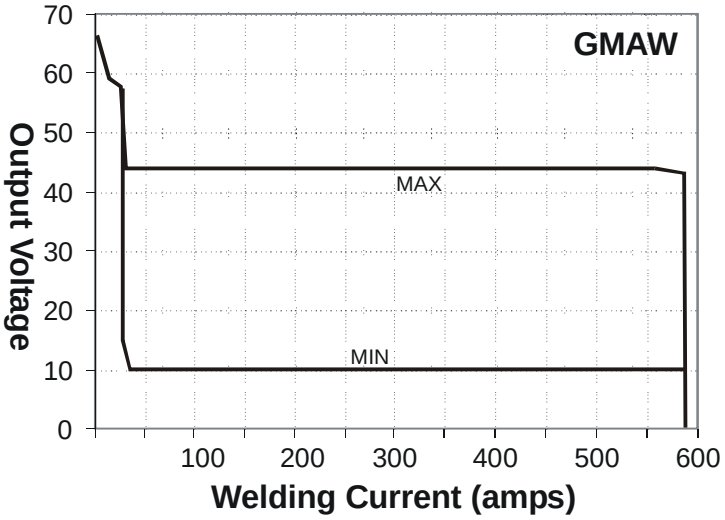


Figure 28 – Volt/Amp curves of the TRANSMIG 500i (GMAW)

23. TRANSMIG 500i Power Source Circuit Diagrams

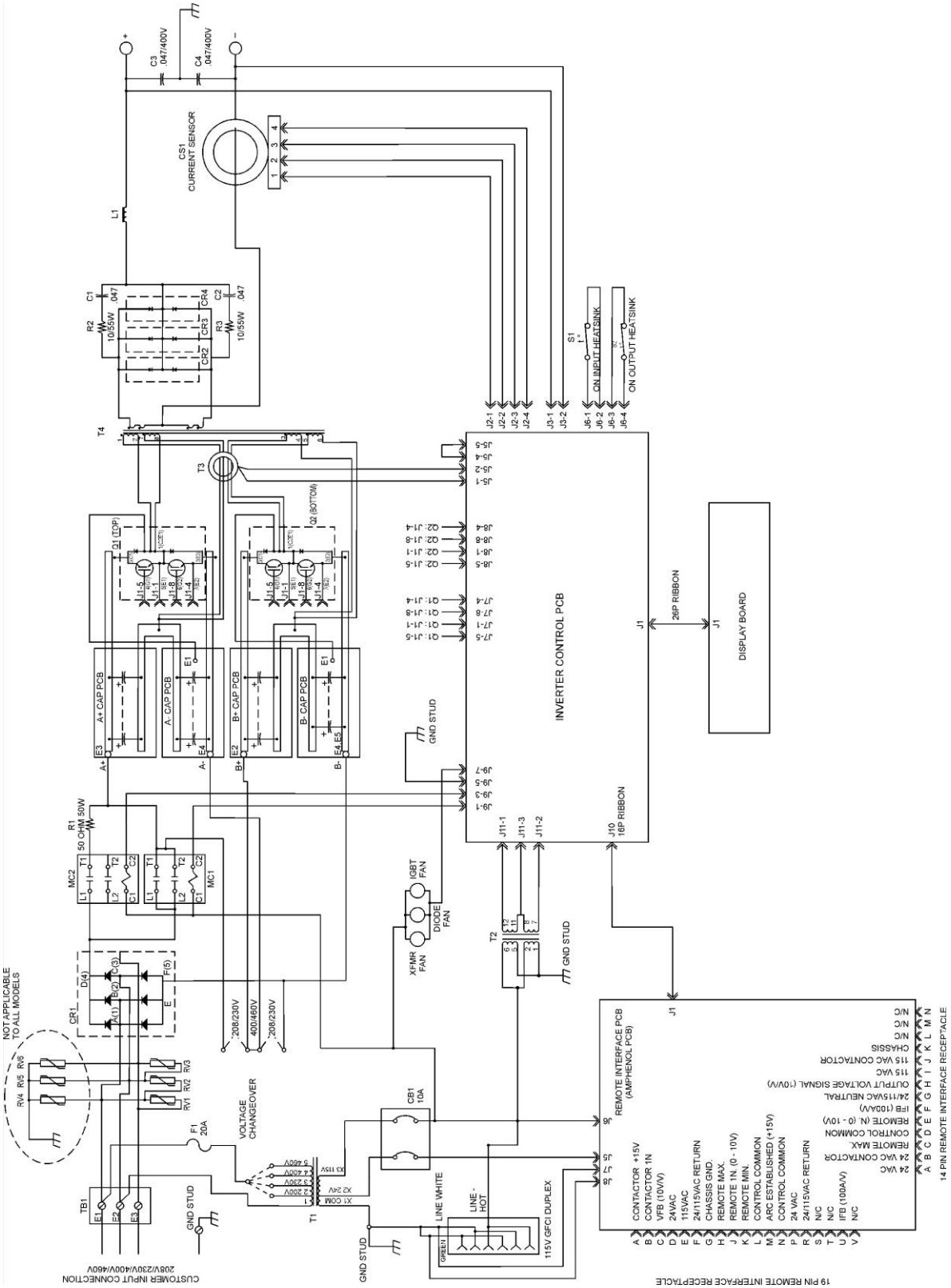


Figure 29 – Power Source circuit (Sheet 1) for TRANSMIG 350 & 500

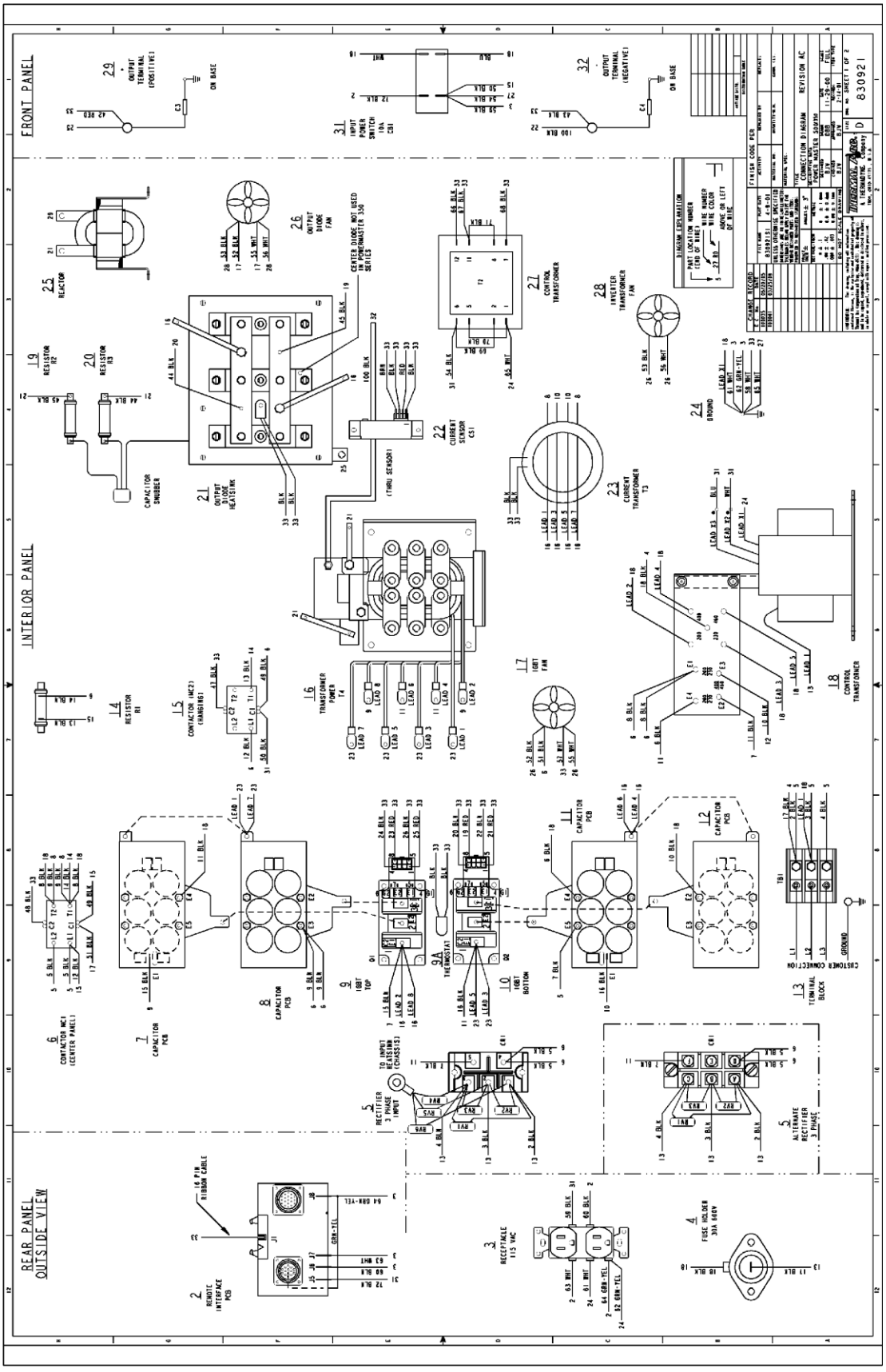


Figure 30 – Power Source circuit (Sheet 2) for TRANSMIG 350 – 500 P

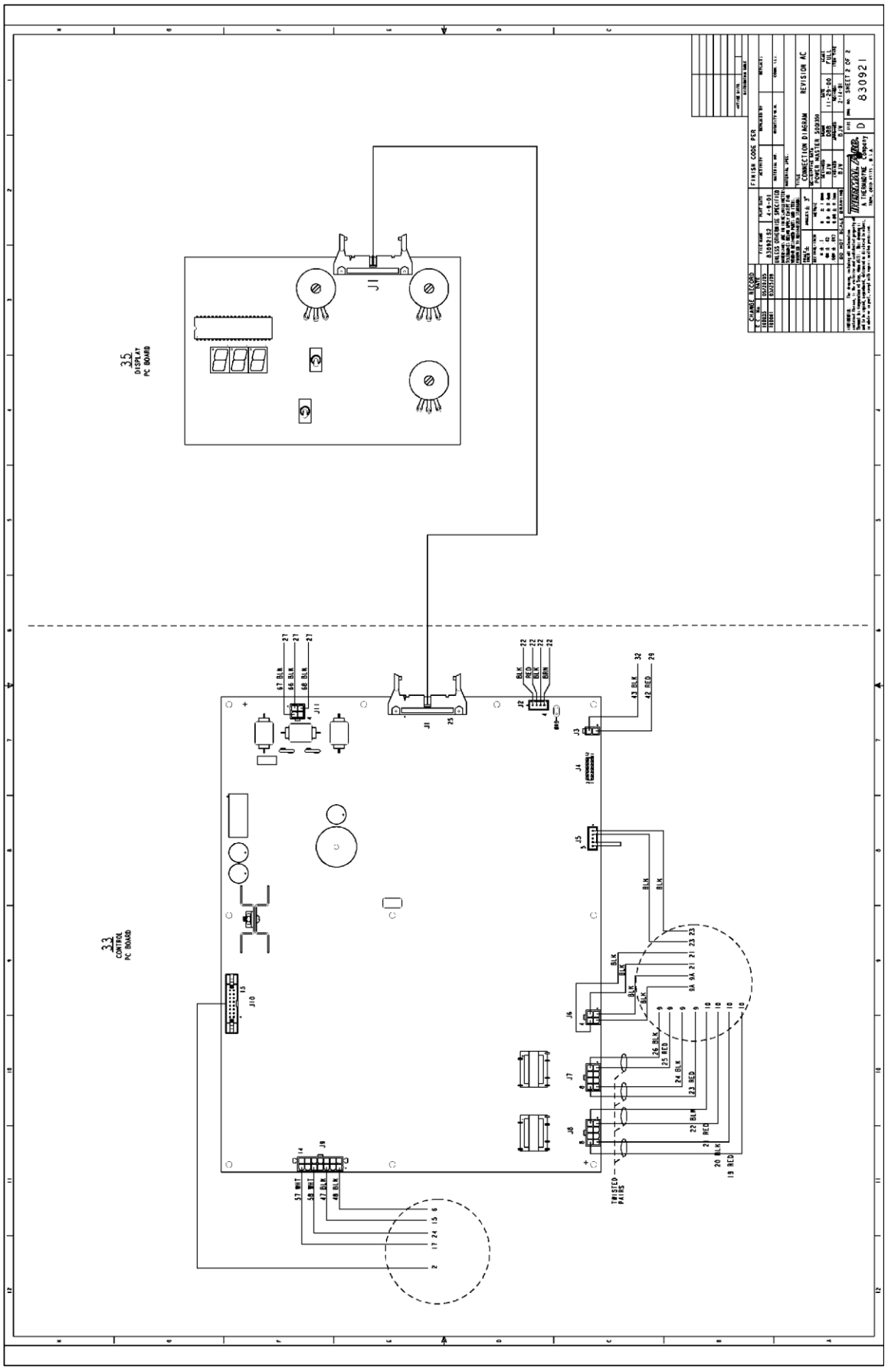


Figure 31 – Power Source circuit (Sheet 3) for TRANSMIG 500i

NOTES:

TRANSMIG 500i

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Manufacturer and Supplier of Welding Consumables and Equipment

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