



VA 4000

ULTRAFEED® SEMIAUTOMATIC WIRE FEEDER



Operating Manual

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Issue Date: March 17, 2006

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Operating Features:





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Congratulations on your new Thermal Arc product. We are proud to have you as our customer and will strive to provide you with the best service and reliability in the industry. This product is backed by our extensive warranty and world-wide service network. To locate your nearest distributor or service agency call 1-800-752-7621, or visit us on the web at **www.Thermalarc.com**.

This Operating Manual has been designed to instruct you on the correct use and operation of your Thermal Arc product. Your satisfaction with this product and its safe operation is our ultimate concern. Therefore please take the time to read the entire manual, especially the Safety Precautions. They will help you to avoid potential hazards that may exist when working with this product.

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We distinguish ourselves from our competition through market-leading, dependable products that have stood the test of time. We pride ourselves on technical innovation, competitive prices, excellent delivery, superior customer service and technical support, together with excellence in sales and marketing expertise.

Above all, we are committed to develop technologically advanced products to achieve a safer working environment within the welding industry.

WARNINGS

Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment.

While the information contained in this Manual represents the Manufacturer's best judgement, the Manufacturer assumes no liability for its use.

Ultrafeed VA 4000 Semiautomatic Wire Feeder
Instruction Manual Number 0-4836 for:
Ultrafeed VA 4000 Part Number W3400001

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Publication Date: March 17, 2006

Record the following information for Warranty purposes:

Where Purchased: _____

Purchase Date: _____

Equipment Serial #: _____

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SECTION 1:

SAFETY INSTRUCTIONS AND WARNINGS



WARNING

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR. DO NOT LOSE THESE INSTRUCTIONS. READ OPERATING/INSTRUCTION MANUAL BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.

Welding products and welding processes can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.

Safe practices have developed from past experience in the use of welding and cutting. These practices must be learned through study and training before using this equipment. Some of these practices apply to equipment

connected to power lines; other practices apply to engine driven equipment. Anyone not having extensive training in welding and cutting practices should not attempt to weld.

Safe practices are outlined in the American National Standard Z49.1 entitled: **SAFETY IN WELDING AND CUTTING**. This publication and other guides to what you should learn before operating this equipment are listed at the end of these safety precautions. **HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.**

1.01 Arc Welding Hazards



WARNING

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect input power or stop engine before installing or servicing this equipment. Lock input power disconnect switch open, or remove line fuses so power cannot be turned on accidentally.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service.

7. Use fully insulated electrode holders. Never dip holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Ground the workpiece to a good electrical (earth) ground.
11. Do not touch electrode while in contact with the work (ground) circuit.
12. Use only well-maintained equipment. Repair or replace damaged parts at once.
13. In confined spaces or damp locations, do not use a welder with AC output unless it is equipped with a voltage reducer. Use equipment with DC output.
14. Wear a safety harness to prevent falling if working above floor level.
15. Keep all panels and covers securely in place.



WARNING

ARC RAYS can burn eyes and skin; NOISE can damage hearing. Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

1. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in Safety Standards) to protect your face and eyes when welding or watching.
2. Wear approved safety glasses. Side shields recommended.

ULTRAFEED VA 4000

- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
- Use approved ear plugs or ear muffs if noise level is high.



WARNING

FUMES AND GASES can be hazardous to your health.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



WARNING

WELDING can cause fire or explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks or drums.
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.

Eye protection filter shade selector for welding or cutting (goggles or helmet), from AWS A6.2-73.					
<i>Welding or cutting</i>	<i>Electrode Size</i>	<i>Filter</i>	<i>Welding or cutting</i>	<i>Electrode Size</i>	<i>Filter</i>
Torch soldering		2	Gas metal-arc		
Torch brazing		3 or 4	Non-ferrous base metal	All	11
Oxygen Cutting			Ferrous base metal	All	12
Light	Under 1 in., 25 mm	3 or 4	Gas tungsten arc welding	All	12
Medium	1 to 6 in., 25-150 mm	4 or 5	(TIG)	All	12
Heavy	Over 6 in., 150 mm	5 or 6	Atomic hydrogen welding	All	12
Gas welding			Carbon arc welding	All	12
Light	Under 1/8 in., 3 mm	4 or 5	Plasma arc welding		
Medium	1/8 to 1/2 in., 3-12 mm	5 or 6	Carbon arc air gouging		
Heavy	Over 1/2 in., 12 mm	6 or 8	Light		12
Shielded metal-arc	Under 5/32 in., 4 mm	10	Heavy		14
	5/32 to 1/4 in.,	12	Plasma arc cutting		
	Over 1/4 in., 6.4 mm	14	Light	Under 300 Amp	9
			Medium	300 to 400 Amp	12
			Heavy	Over 400 Amp	14



WARNING

FLYING SPARKS AND HOT METAL can cause injury.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.



WARNING

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.



WARNING

Engines can be dangerous.



WARNING

ENGINE EXHAUST GASES can kill.

Engines produce harmful exhaust gases.

1. Use equipment outside in open, well-ventilated areas.

2. If used in a closed area, vent engine exhaust outside and away from any building air intakes.



WARNING

ENGINE FUEL can cause fire or explosion.

Engine fuel is highly flammable.

1. Stop engine before checking or adding fuel.
2. Do not add fuel while smoking or if unit is near any sparks or open flames.
3. Allow engine to cool before fueling. If possible, check and add fuel to cold engine before beginning job.
4. Do not overfill tank — allow room for fuel to expand.
5. Do not spill fuel. If fuel is spilled, clean up before starting engine.



WARNING

MOVING PARTS can cause injury.

Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.

1. Keep all doors, panels, covers, and guards closed and securely in place.
2. Stop engine before installing or connecting unit.
3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
4. To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
5. Keep hands, hair, loose clothing, and tools away from moving parts.
6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.



WARNING

SPARKS can cause BATTERY GASES TO EXPLODE; BATTERY ACID can burn eyes and skin.

Batteries contain acid and generate explosive gases.

1. Always wear a face shield when working on a battery.
2. Stop engine before disconnecting or connecting battery cables.
3. Do not allow tools to cause sparks when working on a battery.
4. Do not use welder to charge batteries or jump start vehicles.
5. Observe correct polarity (+ and -) on batteries.



WARNING

STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.

The coolant in the radiator can be very hot and under pressure.

1. Do not remove radiator cap when engine is hot. Allow engine to cool.
2. Wear gloves and put a rag over cap area when removing cap.
3. Allow pressure to escape before completely removing cap.



WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety code Sec. 25249.5 et seq.)

NOTE

Considerations About Welding And The Effects of Low Frequency Electric and Magnetic Fields

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, Biological Effects of Power Frequency Electric & Magnetic Fields - Background Paper, OTA-BP-E-63 (Washington, DC: U.S. Government Printing Office, May 1989): "...there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields and interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."

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

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cable around the body.
4. Keep welding power source and cables as far away from body as practical.

ABOUT PACEMAKERS:

The above procedures are among those also normally recommended for pacemaker wearers. Consult your doctor for complete information.

1.02 Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1.03 Symbol Chart

Note that only some of these symbols will appear on your model.

	On
	Off
	Dangerous Voltage
	Increase/Decrease
	Circuit Breaker
	AC Auxiliary Power
	Fuse
A	Amperage
V	Voltage
Hz	Hertz (cycles/sec)
f	Frequency
	Negative
	Positive
	Direct Current (DC)
	Protective Earth (Ground)
	Line
	Line Connection
	Auxiliary Power
115V 15A 	Receptacle Rating-Auxiliary Power

1 	Single Phase
3 	Three Phase
	Three Phase Static Frequency Converter-Transformer-Rectifier
	Remote
X	Duty Cycle
%	Percentage
	Panel/Local
	Shielded Metal Arc Welding (SMAW)
	Gas Metal Arc Welding (GMAW)
	Gas Tungsten Arc Welding (GTAW)
	Air Carbon Arc Cutting (CAC-A)
	Constant Current
	Constant Voltage Or Constant Potential
	High Temperature
	Fault Indication
	Arc Force
	Touch Start (GTAW)
	Variable Inductance
	Voltage Input

	Wire Feed Function
	Wire Feed Towards Workpiece With Output Voltage Off.
	Welding Gun
	Purging Of Gas
	Continuous Weld Mode
	Spot Weld Mode
	Spot Time
	Preflow Time
	Postflow Time
 2 Step Trigger Operation Press to initiate wirefeed and welding, release to stop.	
 4 Step Trigger Operation Press and hold for preflow, release to start arc. Press to stop arc, and hold for preflow.	
	Burnback Time
IPM	Inches Per Minute
MPM	Meters Per Minute
Art # A-04130	

1.04 Precautions De Securite En Soudage A L'arc



MISE EN GARDE

LE SOUDAGE A L'ARC EST DANGEREUX

PROTEGEZ-VOUS, AINSI QUE LES AUTRES, CONTRE LES BLESSURES GRAVES POSSIBLES OU LA MORT. NE LAISSEZ PAS LES ENFANTS S'APPROCHER, NI LES PORTEURS DE STIMULATEUR CARDIAQUE (A MOINS QU'ILS N'AIENT CONSULTE UN MEDECIN). CONSERVEZ CES INSTRUCTIONS. LISEZ LE MANUEL D'OPERATION OU LES INSTRUCTIONS AVANT D'INSTALLER, UTILISER OU ENTREtenir CET EQUIPEMENT.

Les produits et procédés de soudage peuvent sauser des blessures graves ou la mort, de même que des dommages au reste du matériel et à la propriété, si l'utilisateur n'adhère pas strictement à toutes les règles de sécurité et ne prend pas les précautions nécessaires.

En soudage et coupage, des pratiques sécuritaires se sont développées suite à l'expérience passée. Ces pratiques doivent être apprises par étude ou entraînement avant d'utiliser l'équipement. Toute personne n'ayant pas suivi un entraînement intensif en soudage et coupage ne devrait pas tenter de souder. Certaines pratiques concernent les équipements raccordés aux lignes d'alimentation alors que d'autres s'adressent aux groupes électrogènes.

La norme Z49.1 de l'American National Standard, intitulée "SAFETY IN WELDING AND CUTTING" présente les pratiques sécuritaires à suivre. Ce document ainsi que d'autres guides que vous devriez connaître avant d'utiliser cet équipement sont présentés à la fin de ces instructions de sécurité.

SEULES DES PERSONNES QUALIFIEES DOIVENT FAIRE DES TRAVAUX D'INSTALLATION, DE REPARATION, D'ENTRETIEN ET D'ESSAI.

1.05 Dangers relatifs au soudage à l'arc



AVERTISSEMENT

L'ELECTROCUTION PEUT ETRE MORTELLE.

Une décharge électrique peut tuer ou brûler gravement. L'électrode et le circuit de soudage sont sous tension dès la mise en circuit. Le circuit d'alimentation et les circuits internes de l'équipement sont aussi sous tension dès la mise en marche. En soudage automatique ou semi-automatique avec fil, ce dernier, le rouleau ou la bobine de fil, le logement des galets d'entraînement et toutes les pièces métalliques en contact avec le fil de soudage sont sous tension. Un équipement inadéquatement installé ou inadéquatement mis à la terre est dangereux.

1. Ne touchez pas à des pièces sous tension.
2. Portez des gants et des vêtements isolants, secs et non troués.
3. Isolez-vous de la pièce à souder et de la mise à la terre au moyen de tapis isolants ou autres.
4. Déconnectez la prise d'alimentation de l'équipement ou arrêtez le moteur avant de l'installer ou d'en faire l'entretien. Bloquez le commutateur en circuit ouvert ou enlevez les fusibles de l'alimentation afin d'éviter une mise en marche accidentelle.
5. Veuillez à installer cet équipement et à le mettre à la terre selon le manuel d'utilisation et les codes nationaux, provinciaux et locaux applicables.

6. Arrêtez tout équipement après usage. Coupez l'alimentation de l'équipement s'il est hors d'usage ou inutilisé.
7. N'utilisez que des porte-électrodes bien isolés. Ne jamais plonger les porte-électrodes dans l'eau pour les refroidir. Ne jamais les laisser traîner par terre ou sur les pièces à souder. Ne touchez pas aux porte-électrodes raccordés à deux sources de courant en même temps. Ne jamais toucher quelqu'un d'autre avec l'électrode ou le porte-électrode.
8. N'utilisez pas de câbles électriques usés, endommagés, mal épissés ou de section trop petite.
9. N'enroulez pas de câbles électriques autour de votre corps.
10. N'utilisez qu'une bonne prise de masse pour la mise à la terre de la pièce à souder.
11. Ne touchez pas à l'électrode lorsqu'en contact avec le circuit de soudage (terre).
12. N'utilisez que des équipements en bon état. Réparez ou remplacez aussitôt les pièces endommagées.
13. Dans des espaces confinés ou mouillés, n'utilisez pas de source de courant alternatif, à moins qu'il soit muni d'un réducteur de tension. Utilisez plutôt une source de courant continu.
14. Portez un harnais de sécurité si vous travaillez en hauteur.
15. Fermez solidement tous les panneaux et les capots.

**AVERTISSEMENT**

LE RAYONNEMENT DE L'ARC PEUT BRÛLER LES YEUX ET LA PEAU; LE BRUIT PEUT ENDOMMAGER L'OUÏE.

L'arc de soudage produit une chaleur et des rayons ultraviolets intenses, susceptibles de brûler les yeux et la peau. Le bruit causé par certains procédés peut endommager l'ouïe.

1. Portez une casque de soudeur avec filtre oculaire de nuance appropriée (consultez la norme ANSI Z49 indiquée ci-après) pour vous protéger le visage et les yeux lorsque vous soudez ou que vous observez l'exécution d'une soudure.
2. Portez des lunettes de sécurité approuvées. Des écrans latéraux sont recommandés.
3. Entourez l'aire de soudage de rideaux ou de cloisons pour protéger les autres des coups d'arc ou de l'éblouissement; avertissez les observateurs de ne pas regarder l'arc.
4. Portez des vêtements en matériaux ignifuges et durables (laine et cuir) et des chaussures de sécurité.
5. Portez un casque antibruit ou des bouchons d'oreille approuvés lorsque le niveau de bruit est élevé.

**AVERTISSEMENT**

LES VAPEURS ET LES FUMÉES SONT DANGEREUSES POUR LA SANTÉ.

Le soudage dégage des vapeurs et des fumées dangereuses à respirer.

1. Eloignez la tête des fumées pour éviter de les respirer.
2. A l'intérieur, assurez-vous que l'aire de soudage est bien ventilée ou que les fumées et les vapeurs sont aspirées à l'arc.
3. Si la ventilation est inadéquate, portez un respirateur à adduction d'air approuvé.
4. Lisez les fiches signalétiques et les consignes du fabricant relatives aux métaux, aux produits consommables, aux revêtements et aux produits nettoyants.
5. Ne travaillez dans un espace confiné que s'il est bien ventilé; sinon, portez un respirateur à adduction d'air. Les gaz protecteurs de soudage peuvent déplacer l'oxygène de l'air et ainsi causer des malaises ou la mort. Assurez-vous que l'air est propre à la respiration.
6. Ne soudez pas à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir avec des vapeurs et former des gaz hautement toxiques et irritants.

SELECTION DES NUANCES DE FILTRES OCULAIRES POUR LA PROTECTION DES YEUX EN COUPAGE ET SOUDAGE (selon AWS à 8.2-73)					
Opération de coupage ou soudage	Dimension d'électrode ou Épaisseur de métal ou Intensité de courant	Nuance de filtre oculaire	Opération de coupage ou soudage	Dimension d'électrode ou Épaisseur de métal ou Intensité de courant	Nuance de filtre oculaire
Brassage tendre au chalumeau	toutes conditions	2	Soudage à l'arc sous gaz avec fil plein (GMAW)		
Brassage fort au chalumeau	toutes conditions	3 ou 4	métaux non-ferreux	toutes conditions	11
Oxycoupage			métaux ferreux	toutes conditions	12
mince	moins de 1 po. (25 mm)	2 ou 3	Soudage à l'arc sous gaz avec électrode de tungstène (GTAW)	toutes conditions	12
moyen	de 1 à 6 po. (25 à 150 mm)	4 ou 5	Soudage à l'hydrogène atomique (AHW)	toutes conditions	12
épais	plus de 6 po. (150 mm)	5 ou 6	Soudage à l'arc avec électrode de carbone (CAW)	toutes conditions	12
Soudage aux gaz			Soudage à l'arc Plasma (PAW)	toutes dimensions	12
mince	moins de 1/8 po. (3 mm)	4 ou 5	Gougeage Air-Arc avec électrode de carbone		
moyen	de 1/8 à 1/2 po. (3 à 12 mm)	5 ou 6	mince		12
épais	plus de 1/2 po. (12 mm)	6 ou 8	épais		14
Soudage à l'arc avec électrode enrobées (SMAW)	moins de 5/32 po. (4 mm)	10	Coupage à l'arc Plasma (PAC)		
	5/32 à 1/4 po. (4 à 6.4 mm)	12	mince	moins de 300 ampères	9
	plus de 1/4 po. (6.4 mm)	14	moyen	de 300 à 400 ampères	12
			épais	plus de 400 ampères	14

7. Ne soudez des tôles galvanisées ou plaquées au plomb ou au cadmium que si les zones à souder ont été grattées à fond, que si l'espace est bien ventilé; si nécessaire portez un respirateur à aduction d'air. Car ces revêtements et tout métal qui contient ces éléments peuvent dégager des fumées toxiques au moment du soudage.

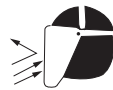


AVERTISSEMENT

LE SOUDAGE PEUT CAUSER UN INCENDIE OU UNE EXPLOSION

L'arc produit des étincelles et des projections. Les particules volantes, le métal chaud, les projections de soudure et l'équipement surchauffé peuvent causer un incendie et des brûlures. Le contact accidentel de l'électrode ou du fil-électrode avec un objet métallique peut provoquer des étincelles, un échauffement ou un incendie.

1. Protégez-vous, ainsi que les autres, contre les étincelles et du métal chaud.
2. Ne soudez pas dans un endroit où des particules volantes ou des projections peuvent atteindre des matériaux inflammables.
3. Enlevez toutes matières inflammables dans un rayon de 10, 7 mètres autour de l'arc, ou couvrez-les soigneusement avec des bâches approuvées.
4. Méfiez-vous des projections brûlantes de soudage susceptibles de pénétrer dans des aires adjacentes par de petites ouvertures ou fissures.
5. Méfiez-vous des incendies et gardez un extincteur à portée de la main.
6. N'oubliez pas qu'une soudure réalisée sur un plafond, un plancher, une cloison ou une paroi peut enflammer l'autre côté.
7. Ne soudez pas un récipient fermé, tel un réservoir ou un baril.
8. Connectez le câble de soudage le plus près possible de la zone de soudage pour empêcher le courant de suivre un long parcours inconnu, et prévenir ainsi les risques d'électrocution et d'incendie.
9. Ne dégelez pas les tuyaux avec un source de courant.
10. Otez l'électrode du porte-électrode ou coupez le fil au tube-contact lorsqu'inutilisé après le soudage.
11. Portez des vêtements protecteurs non huileux, tels des gants en cuir, une chemise épaisse, un pantalon revers, des bottines de sécurité et un casque.



AVERTISSEMENT

LES ETINCELLES ET LES PROJECTIONS BRULANTES PEUVENT CAUSER DES BLESSURES.

Le piquage et le meulage produisent des particules métalliques volantes. En refroidissant, la soudure peut projeter des éclats de laitier.

1. Portez un écran facial ou des lunettes protectrices approuvées. Des écrans latéraux sont recommandés.
2. Portez des vêtements appropriés pour protéger la peau.



AVERTISSEMENT

LES BOUTEILLES ENDOMMAGEES PEUVENT EXPLOSER

Les bouteilles contiennent des gaz protecteurs sous haute pression. Des bouteilles endommagées peuvent exploser. Comme les bouteilles font normalement partie du procédé de soudage, traitez-les avec soin.

1. Protégez les bouteilles de gaz comprimé contre les sources de chaleur intense, les chocs et les arcs de soudage.
2. Enchaînez verticalement les bouteilles à un support ou à un cadre fixe pour les empêcher de tomber ou d'être renversées.
3. Eloignez les bouteilles de tout circuit électrique ou de tout soudage.
4. Empêchez tout contact entre une bouteille et une électrode de soudage.
5. N'utilisez que des bouteilles de gaz protecteur, des détendeurs, des boyaux et des raccords conçus pour chaque application spécifique; ces équipements et les pièces connexes doivent être maintenus en bon état.
6. Ne placez pas le visage face à l'ouverture du robinet de la bouteille lors de son ouverture.
7. Laissez en place le chapeau de bouteille sauf si en utilisation ou lorsque raccordé pour utilisation.
8. Lisez et respectez les consignes relatives aux bouteilles de gaz comprimé et aux équipements connexes, ainsi que la publication P-1 de la CGA, identifiée dans la liste de documents ci-dessous.



AVERTISSEMENT

LES MOTEURS PEUVENT ETRE DANGEREUX

LES GAZ D'ECHAPPEMENT DES MOTEURS PEUVENT ETRE MORTELS.

Les moteurs produisent des gaz d'échappement nocifs.

1. Utilisez l'équipement à l'extérieur dans des aires ouvertes et bien ventilées.
2. Si vous utilisez ces équipements dans un endroit confiné, les fumées d'échappement doivent être envoyées à l'extérieur, loin des prises d'air du bâtiment.

**AVERTISSEMENT**

LE CARBURANT PEUT CAUSER UN INCENDIE OU UNE EXPLOSION.

Le carburant est hautement inflammable.

1. Arrêtez le moteur avant de vérifier le niveau de carburant ou de faire le plein.
2. Ne faites pas le plein en fumant ou proche d'une source d'étincelles ou d'une flamme nue.
3. Si c'est possible, laissez le moteur refroidir avant de faire le plein de carburant ou d'en vérifier le niveau au début du soudage.
4. Ne faites pas le plein de carburant à ras bord: prévoyez de l'espace pour son expansion.
5. Faites attention de ne pas renverser de carburant. Nettoyez tout carburant renversé avant de faire démarrer le moteur.

**AVERTISSEMENT**

DES PIÈCES EN MOUVEMENT PEUVENT CAUSER DES BLESSURES.

Des pièces en mouvement, tels des ventilateurs, des rotors et des courroies peuvent couper doigts et mains, ou accrocher des vêtements amples.

1. Assurez-vous que les portes, les panneaux, les capots et les protecteurs soient bien fermés.
2. Avant d'installer ou de connecter un système, arrêtez le moteur.
3. Seules des personnes qualifiées doivent démonter des protecteurs ou des capots pour faire l'entretien ou le dépannage nécessaire.
4. Pour empêcher un démarrage accidentel pendant l'entretien, débranchez le câble d'accumulateur à la borne négative.
5. N'approchez pas les mains ou les cheveux de pièces en mouvement; elles peuvent aussi accrocher des vêtements amples et des outils.
6. Réinstallez les capots ou les protecteurs et fermez les portes après des travaux d'entretien et avant de faire démarrer le moteur.

**AVERTISSEMENT**

DES ÉTINCELLES PEUVENT FAIRE EXPLODER UN ACCUMULATEUR; L'ÉLECTROLYTE D'UN ACCUMULATEUR PEUT BRÛLER LA PEAU ET LES YEUX.

Les accumulateurs contiennent de l'électrolyte acide et dégagent des vapeurs explosives.

1. Portez toujours un écran facial en travaillant sur un accumulateur.
2. Arrêtez le moteur avant de connecter ou de déconnecter des câbles d'accumulateur.
3. N'utilisez que des outils anti-étincelles pour travailler sur un accumulateur.
4. N'utilisez pas une source de courant de soudage pour charger un accumulateur ou survolter momentanément un véhicule.
5. Utilisez la polarité correcte (+ et -) de l'accumulateur.

**AVERTISSEMENT**

LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT BRÛLANT SOUS PRESSION PEUVENT BRÛLER LA PEAU ET LES YEUX.

Le liquide de refroidissement d'un radiateur peut être brûlant et sous pression.

1. N'ôtez pas le bouchon de radiateur tant que le moteur n'est pas refroidi.
2. Mettez des gants et posez un torchon sur le bouchon pour l'ôter.
3. Laissez la pression s'échapper avant d'ôter complètement le bouchon.

1.06 Principales Normes De Sécurité

Safety in Welding and Cutting, norme ANSI Z49.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

Safety and Health Standards, OSHA 29 CFR 1910, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

National Electrical Code, norme 70 NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, document P-1, Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, norme CSA W117.2 Association canadienne de normalisation, Standards Sales, 276 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, norme ANSI Z87.1, American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme 51B NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1.07 Graphique de Symbole

Seulement certains de ces symboles apparaîtront sur votre modèle.

	Sous Tension
	Hors Tension
	Tension dangereuse
	Augmentez/Diminuer
	Disjoncteur
	Source AC Auxiliaire
	Fusible
A	Intensité de Courant
V	Tension
Hz	Hertz (cycles/sec)
f	Fréquence
	Négatif
	Positif
	Courant Continue (DC)
	Terre de Protection
	Ligne
	Connexion de la Ligne
	Source Auxiliaire
115V 15A 	Classement de Prise-Source Auxiliaire

1	Mono Phasé
3	Trois Phasé
3~	Tri-Phase Statique Fréquence Convertisseur Transformateur-Redresseur
	Distant
X	Facteur de Marche
%	Pourcentage
	Panneau/Local
	Soudage Arc Electrique Avec Electrode Enrobé (SMAW)
	Soudage à L'arc Avec Fil Electrodes Fusible (GMAW)
	Soudage à L'arc Avec Electrode Non Fusible (GTAW)
	Decoupe Arc Carbone (CAC-A)
	Courant Constant
	Tension Constante Ou Potentiel Constant
	Haute Température
	Force d'Arc
	Amorçage de L'arc au Contact (GTAW)
	Inductance Variable
	Tension

	Déroutement du Fil
	Alimentation du Fil Vers la Pièce de Fabrication Hors Tension
	Torch de Soudage
	Purge Du Gaz
	Mode Continu de Soudure
	Soudure Par Point
	Durée du Pulse
	Durée de Pré-Débit
	Durée de Post-Débit
Détente à 2-Temps Appuyez pour dèruarer l'alimentation du fils et la soudure, le relâcher pour arrêter.	
Détente à 4-Temps Maintenez appuyez pour pré-débit, relailez pour initier l'arc. Appuyez pour arrêter l'arc, et mainteuir pour pré-débit.	
	Problème de Terre
IPM	Pouces Par Minute
MPM	Mètres Par Minute

Art # A-07639

1.08 Declaration Of Conformity



Manufacturer: Thermadyne Corporation
Address: 82 Benning Street
West Lebanon, New Hampshire 03784
USA

The equipment described in this manual conforms to all applicable aspects and regulations of the 'Low Voltage Directive' (European Council Directive 73/23/EEC as amended by Council Directive 93/68/EEC) and to the National legislation for the enforcement of this Directive.

The equipment described in this manual conforms to all applicable aspects and regulations of the "EMC Directive" (European Council Directive 89/336/EEC) and to the National legislation for the enforcement of this Directive.

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

National Standard and Technical Specifications

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

- CSA (Canadian Standards Association) standard C22.2 number 60 for Arc welding equipment.
- UL (Underwriters Laboratory) rating 94VO flammability testing for all printed-circuit boards used.
- GENELEC EN50199 EMC Product Standard for Arc Welding Equipment.
- ISO/IEC 60974-1 (BS 638-PT10) (EN 60 974-1) (EN50192) (EN50078) applicable to plasma cutting equipment and associated accessories.
- For environments with increased hazard of electrical shock, Power Supplies bearing the S mark conform to EN50192 when used in conjunction with hand torches with exposed cutting tips, if equipped with properly installed standoff guides.
- Extensive product design verification is conducted at the manufacturing facility as part of the routine design and manufacturing process. This is to ensure the product is safe, when used according to instructions in this manual and related industry standards, and performs as specified. Rigorous testing is incorporated into the manufacturing process to ensure the manufactured product meets or exceeds all design specifications.

Thermadyne has been manufacturing products for more than 30 years, and will continue to achieve excellence in our area of manufacture.

Manufacturers responsible representative:

Steve Ward
Operations Director
Thermadyne Europe
Europa Building
Chorley N Industrial Park
Chorley, Lancashire,
England PR6 7BX

SECTION 2: INTRODUCTION

2.01 How To Use This Manual

This Owner's Manual applies to just specification or part numbers listed on page 1.

To ensure safe operation, read the entire manual, including the chapter on safety instructions and warnings.

Throughout this manual, the words **WARNING**, **CAUTION**, and **NOTE** may appear. Pay particular attention to the information provided under these headings. These special annotations are easily recognized as follows:



WARNING

A WARNING gives information regarding possible personal injury.



CAUTION

A CAUTION refers to possible equipment damage.

NOTE

A NOTE offers helpful information concerning certain operating procedures.

Additional copies of this manual may be purchased by contacting Thermal Arc at the address and phone number in your area listed in the inside back cover of this manual. Include the Owner's Manual number and equipment identification numbers.

Electronic copies of this manual can also be downloaded at no charge in Acrobat PDF format by going to the Thermal Arc web site listed below and clicking on the Literature Library link:

<http://www.thermalarc.com>

2.02 Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually appear on a nameplate attached to the rear panel. In some cases, the nameplate may be attached to the control panel. Equipment which does not have a name plate such as gun and cable assemblies is identified only by the specification or part number printed on the shipping container. Record these numbers on the bottom of page i for future reference.

2.03 Receipt Of Equipment

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify the carrier immediately to file a claim. Furnish complete information concerning damage claims or shipping errors to the location in your area listed in the inside back cover of this manual.

Include all equipment identification numbers as described above along with a full description of the parts in error.

Move the equipment to the installation site before uncrating the unit. Use care to avoid damaging the equipment when using bars, hammers, etc., to uncrate the unit.

2.04 Symbol Chart

Note that only some of these symbols will appear on your model.

	On
	Off
	Dangerous Voltage
	Increase/Decrease
	Circuit Breaker
	AC Auxiliary Power
	Fuse
A	Amperage
V	Voltage
Hz	Hertz (cycles/sec)
f	Frequency
—	Negative
+	Positive
	Direct Current (DC)
	Protective Earth (Ground)
	Line
	Line Connection
	Auxiliary Power
115V 15A 	Receptacle Rating-Auxiliary Power

1	Single Phase
3	Three Phase
	Three Phase Static Frequency Converter-Transformer-Rectifier
	Remote
X	Duty Cycle
%	Percentage
	Panel/Local
	Shielded Metal Arc Welding (SMAW)
	Gas Metal Arc Welding (GMAW)
	Gas Tungsten Arc Welding (GTAW)
	Air Carbon Arc Cutting (CAC-A)
	Constant Current
	Constant Voltage Or Constant Potential
	High Temperature
	Fault Indication
	Arc Force
	Touch Start (GTAW)
	Variable Inductance
	Voltage Input

	Wire Feed Function
	Wire Feed Towards Workpiece With Output Voltage Off.
	Welding Gun
	Purging Of Gas
	Continuous Weld Mode
	Spot Weld Mode
	Spot Time
	Prewflow Time
	Postflow Time
 2 Step Trigger Operation Press to initiate wirefeed and welding, release to stop.	
 4 Step Trigger Operation Press and hold for preflow, release to start arc. Press to stop arc, and hold for preflow.	
	Burnback Time
IPM	Inches Per Minute
MPM	Meters Per Minute
Art # A-04130	

2.05 General Information

The ULTRAFEED VA 4000 is a semiautomatic, solid state controlled wire feeder capable of a 100% duty cycle. The system offers both load and line voltage compensation helping to maintain a constant wire feed speed, even with changes in the input voltage and/or load. The wire feeder comes complete with a wire spool support assembly that must be installed in the field.

The ULTRAFEED VA 4000's sheet metal box totally encloses the solid state control circuitry. A hinged, latched feedhead cover allows quick and easy access to the feedhead featuring quick change feed rolls, and tool-less knobs and clamps for changeover of guides and guns.

The ULTRAFEED VA 4000 comes with an abundance of standard features including:

- an on/off rocker switch
- a circuit breaker for total system protection
- a wire feed speed control
- a power source voltage control
- an inch switch
- a gas purge switch
- a 2 step / 4 step selector switch
- PC board adjustments for enhanced runin control
- a solid state electronic brake for dynamic braking
- four quick change, gear-driven feed rolls
- a gas valve solenoid
- a low voltage gun trigger circuit for operator safety
- a variety of add-on options to configure the unit for any wire-welding situation.

The ULTRAFEED VA 4000 has been designed to comply with CSA NRTL/C, NEMA EW 3, and IEC 60974-1 standards.

UltraFeed VA 4000 Specifications	
Input Voltage:	115 VAC
Input Frequency:	50/60 Hz
Input Voltage Tolerance	±10%
Maximum Input Current	4.0 Amps
Wire Speed Range for All Filler Wire Sizes	50 - 875 IPM 1.25 - 22.1 MPM
Wire Sizes	0.024 - 1/8" / 0.6 - 3.2
Maximum Wire Coil/Spool Weight	60 lb. / 27 kg
Feed Rolls	4 (All Driven)
Welding Current (I)	500 A @ 100%
Welding Gun/Torch Size	Tweco #4 Std
Maximum Shielding Gas Inlet Pressure	100 P.S.I. / 6.9 Bar
Weight (Less Wire)	41 lbs. / 18.5 kg
Approvals	NEMA EW 3 IEC 60974-1

Table 2-1: Product Specifications

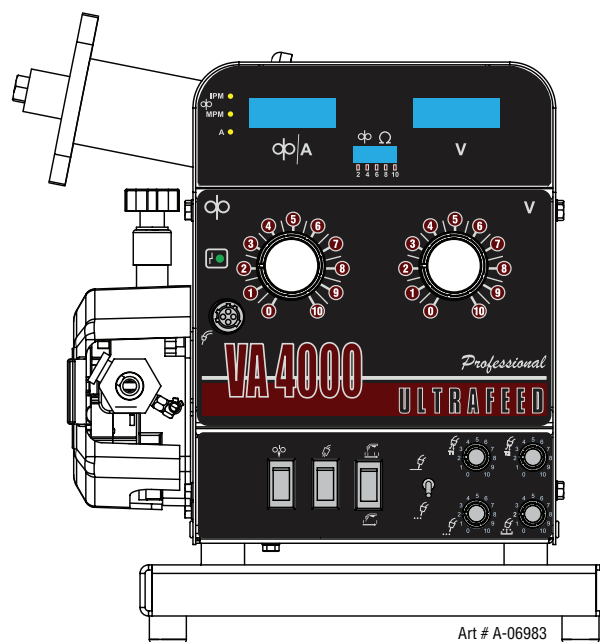


Figure 2-1: Ultrafeed VA 4000 Front View

2.06 Features and Benefits

UltraFeed VA 4000 Features & Benefits	
Features	Benefits
1. Solid State Control	A. Improved wire speed accuracy. B. Line voltage compensation. C. Load compensation. D. Current limit to motor.
2. Standard Inch/Purge	A. Allows “cold” inching of wire at set wire feed speed. B. Allows purging of gas without running wire.
3. Standard 2 Step / 4 Step	A. Allows gun switch activated control as standard (2 Step) or with preflow, trigger hold, and postflow (4 Step).
4. Standard Remote Voltage	A. Allows adjustment of power source arc voltage from the wire feeder. B. Operator has full control of welding parameters at the wire feeder; can remote power source.
5. Standard 6’ Control Cable	A. Ready to weld.
6. Run-In Parameter Adjustment	A. DIP switch located on motor control board allows operator to tune starting characteristics to improve starting.
7. Ground Fault Protection	A. Provides protection against ground fault currents. B. Signals operator of ground fault with STATUS LED.
8. Input Circuit Breaker	A. Provides total system protection.
9. Electronic Motor Protection	A. Protects motor. B. Eliminates need for fuse protection.
10. Small Size	A. Takes up small amount of space.
11. Upgradable	A. Full set of options to build feeder to your needs.
12. Quick Change Feed Rolls	A. Allows operator to change feed rolls without the use of tools. B. Both feed rolls are gear-driven.
13. Rotatable Feedhead	A. Allows operator to modify angle of feedhead to limit severity of bends on the wire. Improved feedability.
14. Gun Clamp Knob	A. Allows operator to secure welding gun to the feedhead without the use of tools.
15. Welding Gun Quick Connects	A. Offers a quick and easy connection for welding guns.
16. Hinged Feedhead Cover	A. Permits quick and easy access to the wire drive system.
17. Dynamic Brake	A. Solid State control of motor brake offers precise stopping of the wire.
18. Replaceable Motor Brushes	A. Extends motor life.
19. Needle Bearing Construction On Motor Output Shaft	A. Reduces friction and extends bearing life over a sleeve bearing.
20. Gas Valve Solenoid	A. Controls the “on / off” flow of shielding gas.
21. 100% Duty Cycle	A. Eliminates shutdowns due to overtemperature.

2.07 Options and Accessories

Refer to the Appendix section of this manual for the list of available options and accessories for this product.

SECTION 3: INSTALLATION

3.01 Connections

Refer to the System Outline drawing in the Appendix of this manual for details.

1. Make the proper welding cable connections between the power source and wire feeder and between the power source and work connection.
2. Connect the control cable from the feeder to the power source. Control cable extensions are available; Refer to Available Options.

NOTE

An optional 870000-001 adapter cable will be required for connection to a power source with only a 5 pin amphenol connection and AC voltage outlets. An optional 870093B-001 adapter cable will be required for connection to a power source with only a 14 pin amphenol connection. These options are only applicable to 19 pin plug units.

3. Make the proper gas line connection from the gas supply to the wire feeder gas valve (if gas will be used).
4. Attach the welding gun to the wire feeder.
5. Connect the welding gun control leads to the wire feeder gun switch terminals located on the front of the feeder.

3.02 Grounding

To assure operator safety in the case of a fault condition, the frame of the power source (welding machine) must be grounded. The wire feeder sheet metal frame is grounded only through pin G (for 19 pin plug) of the control cable that connects to the power source. Therefore, if the power source frame is not grounded, then, the wire feeder sheet metal frame is not grounded, and a shock hazard could possibly develop. Follow the instructions found in the power source Owner's Manual for correct grounding methods.

3.03 EMI Considerations

Electromagnetic interference (EMI) is common in today's complex industrial environment. At times, EMI levels can become great enough to affect the operation of the machinery. To help reduce and safeguard against EMI levels in the welding area, follow these simple guidelines:

1. Firmly secure all sheet metal panels on the power source and wire feeder. Repair or replace heavily corroded or damaged panels and/or fasteners.
2. Keep the welding cables and control cables as short as possible.
3. Route the '+' and '-' welding cables from a particular power source together.
4. Keep the welding cables as straight as possible; avoid coiling up the cables.
5. Route the control cable away from the welding cables.

NOTE

Grounding of the workpiece may reduce emissions in some, but not all circumstances. To prevent the risk of injury or damage to other electrical equipment when grounding the workpiece, take care to follow all local laws and regulations.

3.04 Installation Of Welding Wire Spool

Refer to Figure 3-1.

NOTE

The wire spool hub supplied with the unit is provided for mounting a 12 inch diameter spool of wire. Optional adapters are available allowing a 8 in diameter spool of wire or a 14 pound coil of wire to be used.

1. Remove the wire spool hub nut by turning counterclockwise.
2. Slide the spool of wire over the wire spool hub, making sure that the alignment pin on the hub enters the hole in the backside of the wire spool.
3. Replace the wire spool hub nut and turn clockwise to a snug position.

NOTE

Install the welding wire spool so that the wire feeds from the bottom of the spool into the input wire guide.

3.05 Adjustment Of Spool Tension

Adjust the wire spool tension so that the wire will feed freely into the input wire guide. However, the spool of welding wire must not “coast” when wire feeding stops. To adjust the wire spool tension, tighten or loosen the hub tension bolt accordingly (Refer to Figure 3-1).

NOTE

Excessive tightening of the hub tension bolt will result in a shorter motor life.

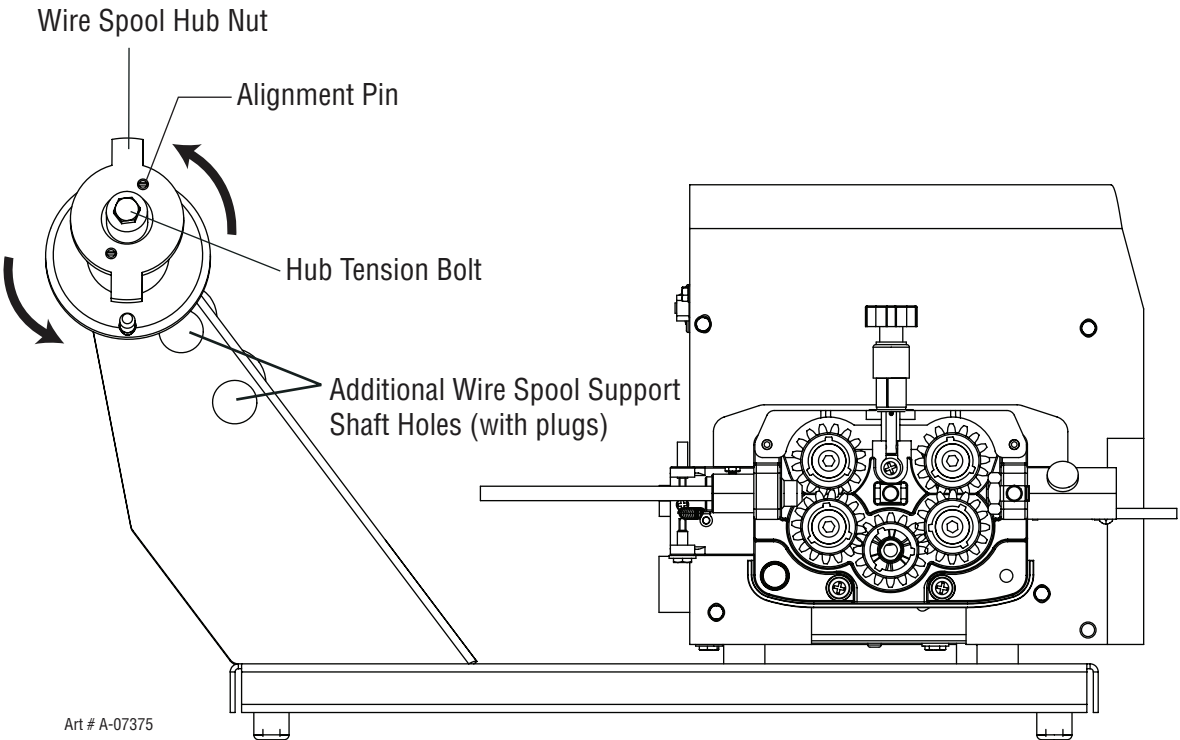


Figure 3-1: Installing Welding Wire Spool

3.06 Input And Output Wire Guide Installation

Refer to Figure 3-2.

Install the input wire guide (the longer one) by loosening the input guide lock screw and inserting the guide into the hole in the feedhead assembly. The recessed end of the guide should be toward the wire spool. Adjust the guide so that it is clear of the feed rolls and tighten the input guide lock screw.

Install the output wire guide in the same manner, with the conical end toward the feed rolls. The tip of the conical end should be as close to the feed rolls as practical. Tighten the output guide lock screw.

NOTE

Before tightening the input and output guide lock screws, install the drive roll to help in the alignment of the wire guides.

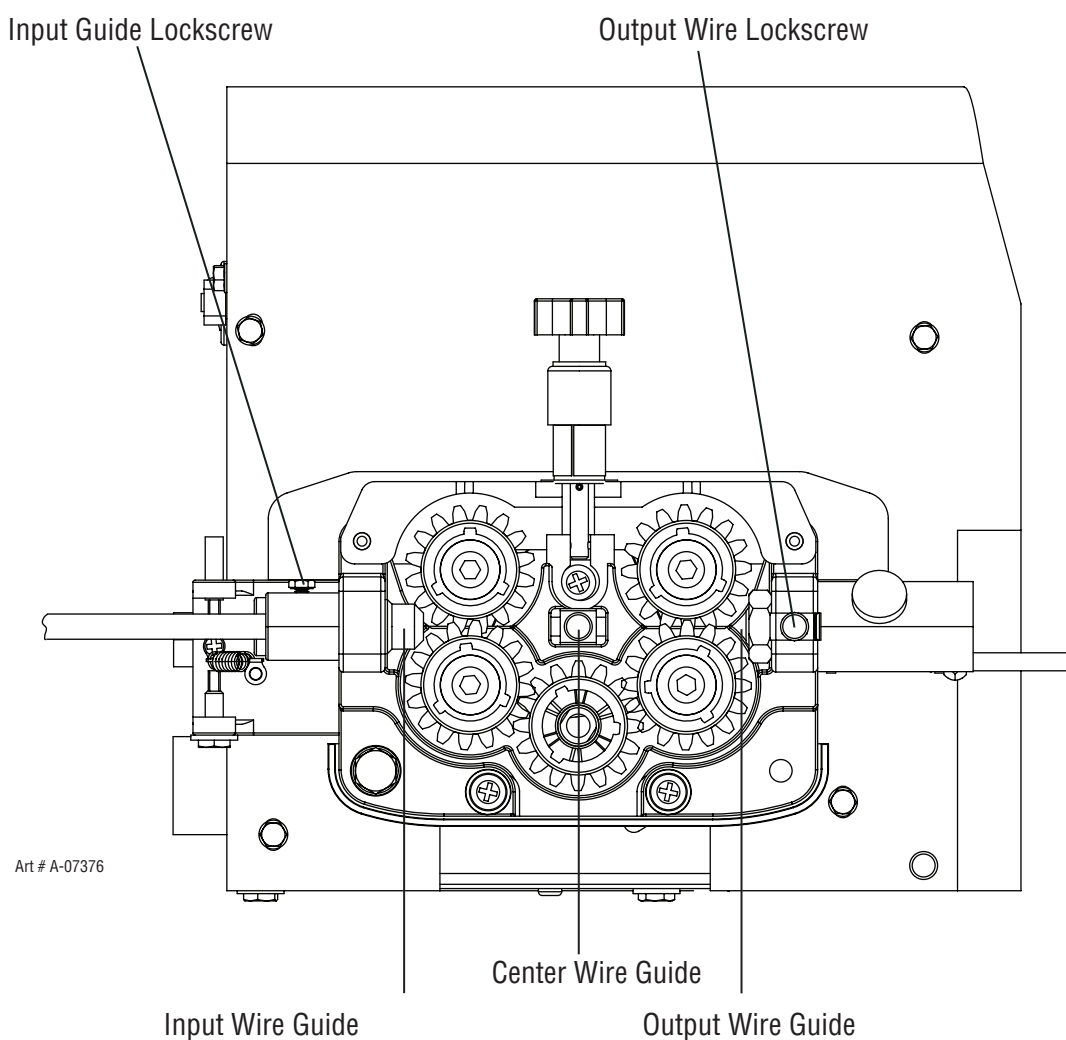


Figure 3-2: Wire Guide Installation

3.07 Selection And Installation Of Feed Rolls

NOTE

Refer to feed roll kit drawing (supplied in the Appendix) to order feed roll kits. Kit includes 4 drive rolls, an input wire guide, a center guide, and an output wire guide for a specific wire type and size.

For selection of feed roll styles, refer to Feedroll Drive Kit Drawing 171435 and Feedroll Chart 375980 in the Appendix section of this manual.

Style 1: Feed rolls consist of flat smooth top rolls and double smooth, vee grooved bottom rolls. They feed .024 - .068" hard and tubular wire.

Style 2: Feed rolls consist of flat knurled top rolls and a double smooth, vee grooved bottom rolls. They feed .030 - .045" hard and tubular wire.

Style 3: Feed rolls consist of double smooth, vee grooved drive rolls. This style supports 0.035 to 1/16" soft wire.

Style 4: Feed rolls consist of double knurled, vee grooved grooved drive rolls. They feed .045 - 5/64" hard and tubular wire.

Style 5: Feed rolls consist of double cog top and bottom rolls. They feed .045 - 1/8" tubular wire.

Style 6: Feed rolls consist of double U-grooved top and bottom feed rolls. They feed .035 - 1/16" soft wire.

NOTE

All grooved feed rolls have their wire size or range stamped on the side of the roll. On rolls with different size grooves, the outer (visible when installed) stamped wire size indicates the groove in use.

Feed rolls are removed by twisting the feed roll retainer cap and aligning the retaining knob splines with the drive gear splines. Feedrolls are installed by putting the feedroll onto the drive gear splines and twisting the feedroll retainer cap so that the splines rest against the face of the feedroll.

NOTE

Installation of all styles of feed rolls for this feeder is identical.

3.08 Welding Gun Compatibility And Installation

Refer to Figure 3-3.

The Ultrafeed VA 4000 wire feeder is designed to be used with most welding guns. In some cases, a special adapter may be required.

To install the welding gun, simply loosen the gun clamp knob and insert the welding gun into the feedhead until it stops. Tighten the gun clamp knob and connect the welding gun control wires to the gun switch receptacle.

NOTE

Before inserting the welding gun into the feedhead, make sure the gun clamp does not extend into the feedhead; otherwise, the welding gun cannot be properly inserted.

NOTE

Check for gas leaks. If leaking gas, gun is not all the way into the feedhead.

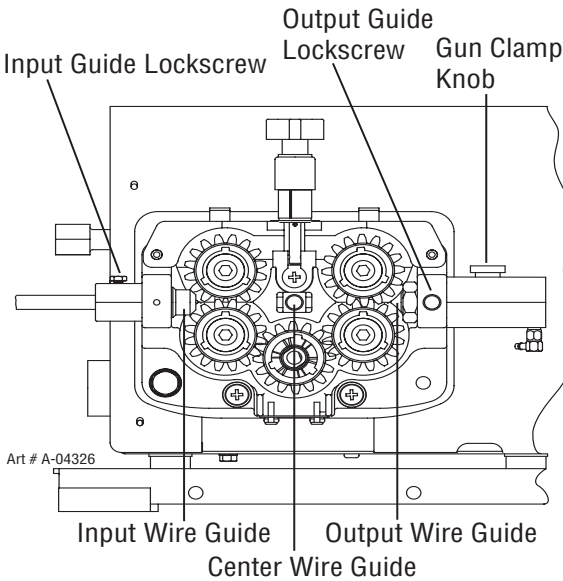


Figure 3-3: Welding Gun Installation

3.09 Threading Wire Into Feedhead

Refer to Figure 3-4.



WARNING

ELECTRIC SHOCK CAN KILL! Make certain the power source and wire feeder are turned OFF. Do not turn the power ON until told to do so in these instructions.

CAUTION

Use care when handling the spooled wire as the wire tends to “unravel” when loosened from the spool. Grasp the end of the wire firmly, and don’t let it get away from you. Make sure that the end of the wire is straight and free of burrs.

1. Place end of the welding wire into the input wire guide. Feed it through the guide and over the drive roll groove closest to the feedhead casting.
2. Loosen the spring tension knob and pull the tension lever forward to unlock the pressure arm.

3. Lift the pressure arm and pass the wire through the output wire guide and into the welding gun assembly (Refer to welding gun manual).
4. Close the pressure arm, and lock in position with the tension lever. To adjust the amount of force the bearing roll exerts on the welding wire, turn the spring tension knob clockwise for increased force or counterclockwise for decreased force.

NOTE

If the force applied to the wire is too great, the welding wire will “bird nest” in the feedhead and not feed properly.

5. Turn the welding machine and wire feeder ON, and set the wire feed speed control to midrange (Refer to Figure 4-1). Remove contact tube from welding gun. Refer to Gun Manual. Press the gun switch or INCH switch until wire feeds out past the gun nozzle. Thread the contact tube over the wire and lock into place and tighten. Cut wire off at about 1/4 inch (6 mm) from the nozzle.



WARNING

The wire is electrically “HOT” if wire is fed by depressing the gun switch. Wire contact with the workpiece will cause an arc with gun switch depressed. Feed motor will run feeding “HOT” wire.

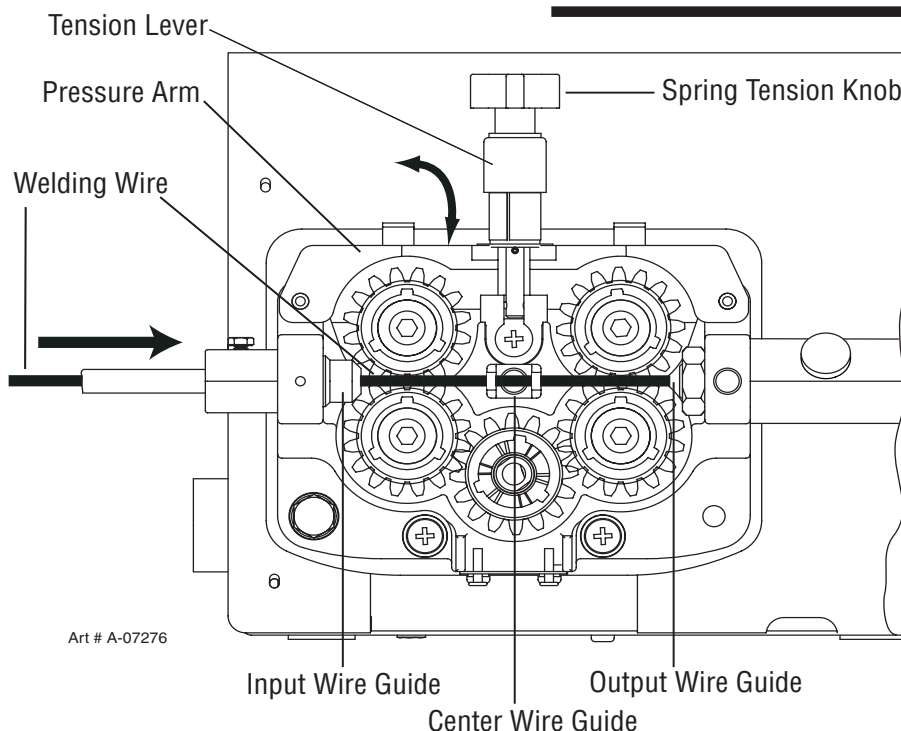


Figure 3-4: Threading Wire Into Feedhead

SECTION 4: OPERATION

4.01 Front Panel

1. **GUN SWITCH RECEPTACLE:** The gun switch receptacle accepts the welding gun control wires. The gun switch receptacle is where a gun switch closure is inputted to the wire feeder.
2. **FAULT INDICATOR:** This LED indicates a fault condition exists. If it is flashing, a ground fault has occurred. If it is on continuously, the motor protection circuit has activated.
3. **WIRE FEED SPEED (WFS) CONTROL:** This knob controls wire feed speed. The wire feed speed control knob can be adjusted during setup or actual welding.
4. **WFS/AMP METER:** This meter displays the wire feed speed or amperage.
5. **WIRE SPEED FORCE METER**
6. **VOLT METER:** Displays possible restriction in liner or tips.
7. **ARC VOLTAGE CONTROL:** This knob controls arc voltage or pulse frequency from the power source. The arc voltage (or pulse reference) control can be adjusted during setup or actual welding.
8. **FUNCTION TIMERS:** These knobs provide timed control over preflow/postflow gas, wire burnback distance and spot weld time.
9. **2 STEP / 4 STEP SWITCH:** This switch selects 2 Step or 4 Step mode of operation.
10. **GAS PURGE SWITCH:** This switch will purge shielding gas when pressed.
11. **INCH SWITCH:** This switch will feed wire at the INCH speed (default of set speed). The feeder does not activate the contactor on the power source. Thus, the wire will be cold as long as the power source outputs are controlled by the contactor

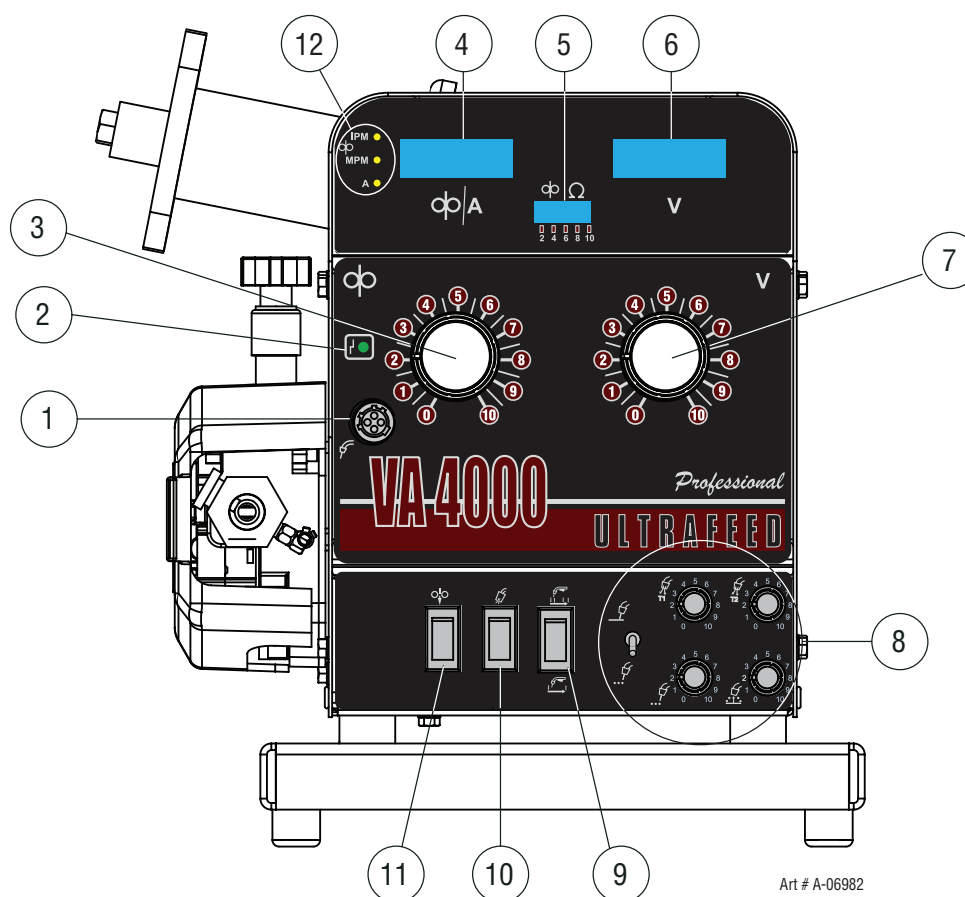


Figure 4-1: Front Panel Controls and Connections

4.02 Rear Panel Controls &Connections

11. CONTROL CABLE SOCKET: The control cable connects to the power source at this 19-pin amphenol connector (of which 14 pins are used). It contains the signals required to allow the welding power source and the wire feeder to work together as a system.



WARNING

The protective earth ground (pin G) of the control cable is established only when the power source is properly grounded. See the power source owner's manual for proper grounding methods.



CAUTION

The relay contacts between pins A and B have a maximum rating of 1/3 Horsepower (HP), 115 VAC or 10A, 230 VAC.

If the power source only has a 5 pin amphenol and AC voltage outlets, a 870000-001 adapter cable will be required for proper hookup with the Ultrafeed VA 4000 wire feeder.

If the power source only has a 14 pin amphenol, a 870093B-001 adapter cable will be required for proper hookup with the Ultrafeed VA 4000 wire feeder. Refer to section 2.07 Options and Accessories.

Control Cable Pin	Function
A	Contactor + (Shorted to B to turn on Power Source)
B	Contactor - (Shorted to A to turn on Power Source)
C	Voltage Feedback (1 Volt is 10 Arc Volts), or '+' Power Source Terminal
D	Not Used
E	115 VAC Hot
F	115 VAC Neutral
G	Protective Earth Ground
H	Remote Control Maximum
J	Remote Control Signal
K	Remote Control Minimum
L	Control Circuit Common
M	Arc Established (= +15 VDC)
N	Power Source Select Line
P	Not Used
R	Not Used
S	Not Used
T	Not Used
U	Current Feedback (1 Volt is 100 Arc Amps)
V	'-' Power Source Terminal

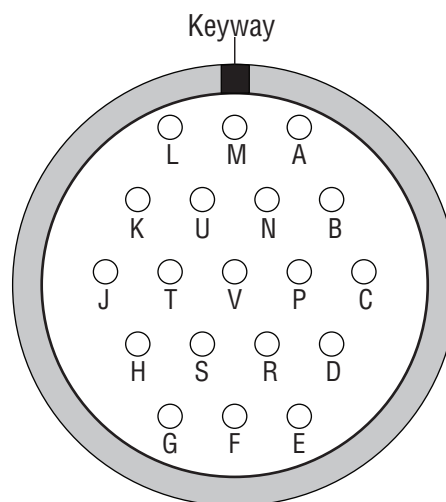


Figure 4-2: Pin Identification

Table 4-1: 19-Pin Control Cable Descriptions

12.AUXILIARY INTERFACE PORT (J3): These connections are used by the advanced interface kit.

13.CAN INTERFACE PORT (J2): This connection allows the ULTRAFEED VA 4000 to communicate with other select Thermal Arc power sources. This is available with the advanced interface kit.

14.SERIAL PORT (J1): This connection allows the ULTRAFEED VA 4000 to communicate with a personal computer. This feature is available with the advanced interface kit.

15.POWER ON/OFF SWITCH: This switch controls only the wire feeder and not the power source.

16.CIRCUIT BREAKER: This breaker protects the unit from electrical faults.

NOTE

If the circuit breaker trips, it turns the power switch to the OFF position. A short cooling period must be allowed before an attempt is made to reset the unit by pressing the circuit breaker reset switch.

17.GAS VALVE INLET: This is where the shielding gas hose is connected to the wire feeder. The gas valve inlet controls the “on/off” flow of shielding gas through the welding gun.

18.WELD CABLE CONNECTION: This is where the power source welding cable is connected to the feeder. Make sure this connection is tight or arcing could occur.

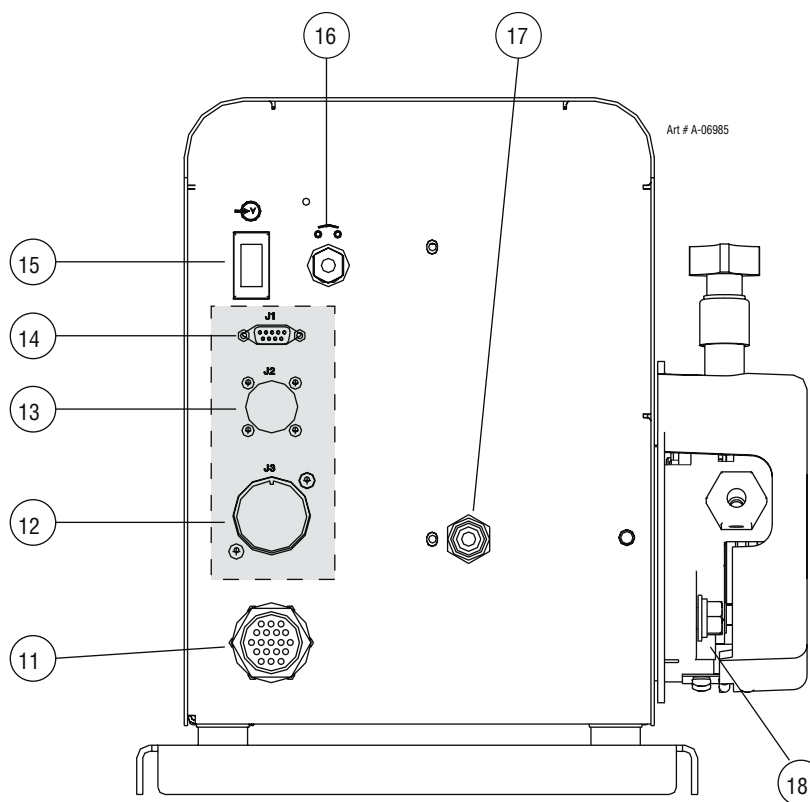


Figure 4-3: Rear Panel Controls and Connections

4.03 Feedhead Components

- 18.INPUT GUIDE LOCKSCREW:** Tighten this lock screw to secure the input wire guide.
- 19.SPRING TENSION KNOB:** Use the spring tension knob to adjust the amount of force the feed rolls exert on the welding wire.
- 20.FEEDROLL GEAR / KNOB :** This knob is used to secure the feedroll to the pressure arm. Rotate the knob to change the feedroll.
- 21.PRESSURE ARM:** This arm pivots off the front of the feedhead to allow access to the wire guides and wire path.
- 22.CENTER GUIDE LOCKSCREW:** Tighten this lock screw to secure the center wire guide.
- 23.OUTPUT GUIDE LOCKSCREW:** Tighten this lock screw to secure the output wire guide.
- 24.GUN CLAMP KNOB:** This knob is used to tighten the welding gun into the feedhead.
- 25.GUN ADAPTER:** This adapter accepts the welding gun plug. It can optionally be replaced with different adapters for a variety of different guns.

- 26.FEEDHEAD POSITIONING SCREW (3x):** These screws are tightened to position the rotation angle of the feedhead. To change the angle of the feedhead, LOOSEN these 3 screws and turn the feedhead to the desired angle. Then tighten the 3 screws to secure.
- 27.INPUT WIRE GUIDE:** This guide is required to direct the welding wire from the drive roll to the welding gun cable.
- 28.WELD CABLE CONNECTION:** This is where the power source welding cable is connected to the feeder. Make sure this connection is tight or arcing could occur.
- 29.HUB TENSION BOLT:** The hub tension bolt is used to adjust the wire spool tension which acts as a mechanical brake to assist in the stopping of the welding wire when the gun switch is released.
- 30.WIRE SPOOL HUB NUT (not shown):** The wire spool hub nut is used to secure the spool of welding wire.

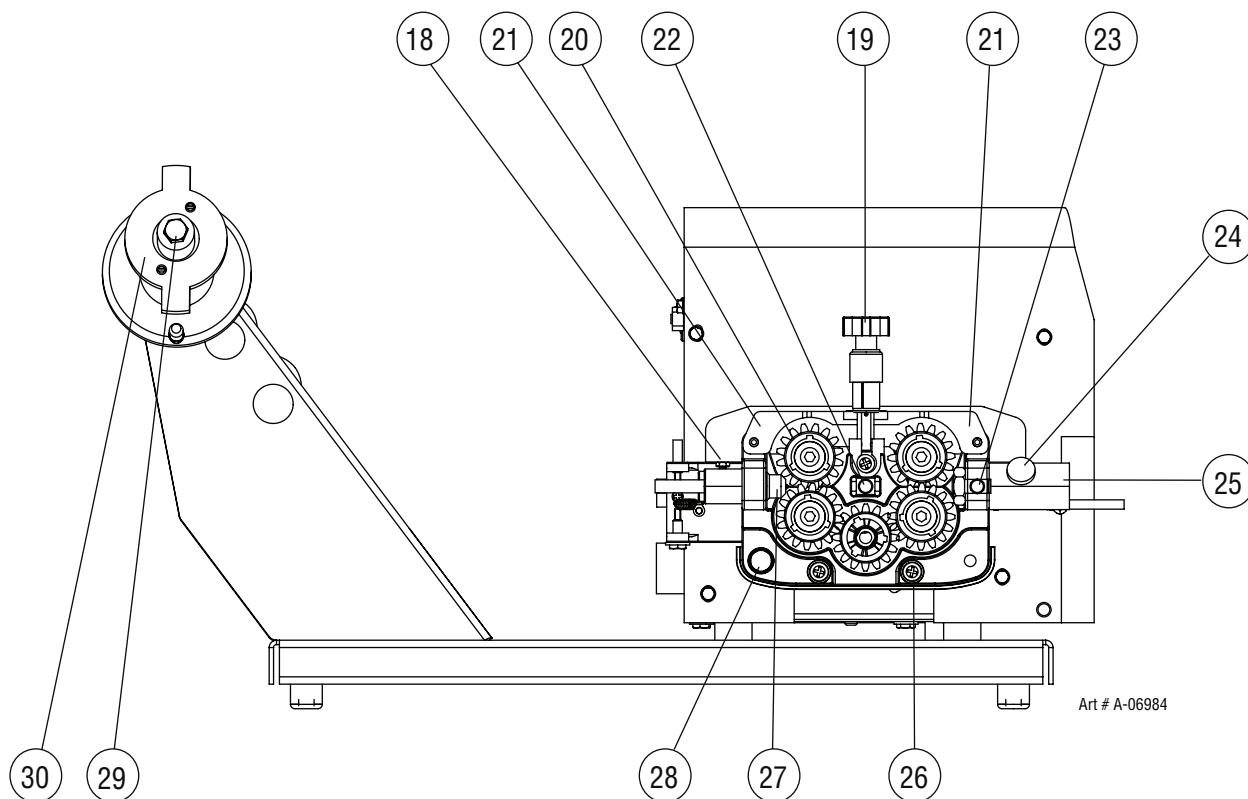


Figure 4-4: Feedhead Components

4.04 Power Source Compatibility

The Ultrafeed VA 4000 wire feeder will work with any Thermal Arc CV or CC/CV power source. If the Thermal Arc power source only offers a 5 pin amphenol connector and AC voltage outlets, a 870000-001 adapter cable will be required to connect between the 19 pin control cable of the wire feeder and the 5 pin amphenol connector and AC voltage outlets of the power source.

If the Thermal Arc power source only offers a 14 pin amphenol connector, a 870093B-001 adapter cable will be required to connect between the 19 pin control cable of the wire feeder and the 14 pin amphenol connector of the power source.

The Ultrafeed VA 4000 will also work with most competitive power sources that provide 115 VAC and require a relay closure to become energized.

4.05 Power Source Compatibility Details

Power Source Compatibility Details	
Machine	Details
PowerMaster 500	Fully Compatible
PowerMaster 500P	For GMAW - Set Motor Control S1 Switches for: Runin Speed 25%, Motor Ramp Rate 0.3 S, Arc Established ON. For Pulse GMAW - Set Motor Control S1 Switches for: Runin Speed - 75%, Motor Ramp Rate - 0.2 S, Arc Established - ON
ExcelArc 6045	Fully Compatible
ExcelArc 8065	For GMAW - Set Motor Control S1 Switches for: Runin Speed 50%, Motor Ramp Rate 0.2 S, Arc Established ON.
Fabstar 4030	Fully Compatible except: Actual arc amps on the wire feeder will not be show and preset volts on the power source will not be displayed.
ArcMaster 300 MST	Fully Compatible
ArcMaster 400 MST	Fully Compatible
ArcMaster 400 MSTP	Fully Compatible

4.06 Prewelding Procedure

Follow all installation instructions for the wire feeder, the welding power source, and the welding gun before attempting to operate the Ultrafeed VA 4000.

1. Make sure all necessary connections have been made (Refer to “Connections” in the Installation chapter of this manual).
2. Turn ON the power source and the wire feeder.
3. Push the PURGE switch of the feeder and adjust the flow of shielding gas.
4. Push the INCH switch of the feeder and adjust the wire feed speed to the desired value by means of the wire feed speed control.



WARNING

If the gun switch is depressed, the electrode (welding wire) is electrically “hot”. Do not permit it to touch any metal or a welding arc may be established which may be injurious to someone’s eyes (flash) or skin (burn).

5. Adjust the voltage of the power source to the desired value. The gun switch must be triggered to close power source contactor.



WARNING

In semiautomatic or automatic wire welding, the welding wire, wire reel (if used), input guide, feed rolls, output guide, feedhead, and welding gun metal parts are all ELECTRICALLY “HOT”.

4.07 Welding - 2 Step Operation

Refer to Figure 4-5.

Position the welding gun above the workpiece and depress the gun switch trigger. Depressing the gun switch trigger enables the gas valve, wire feed motor, and power source; the welding process begins. To end the weld, release the gun switch trigger which disables the gas valve, wire feed motor, and power source.

NOTE

When the gun switch is released, gas will continue to flow for approximately 0.5 seconds. This is a feature of the system and is normal.

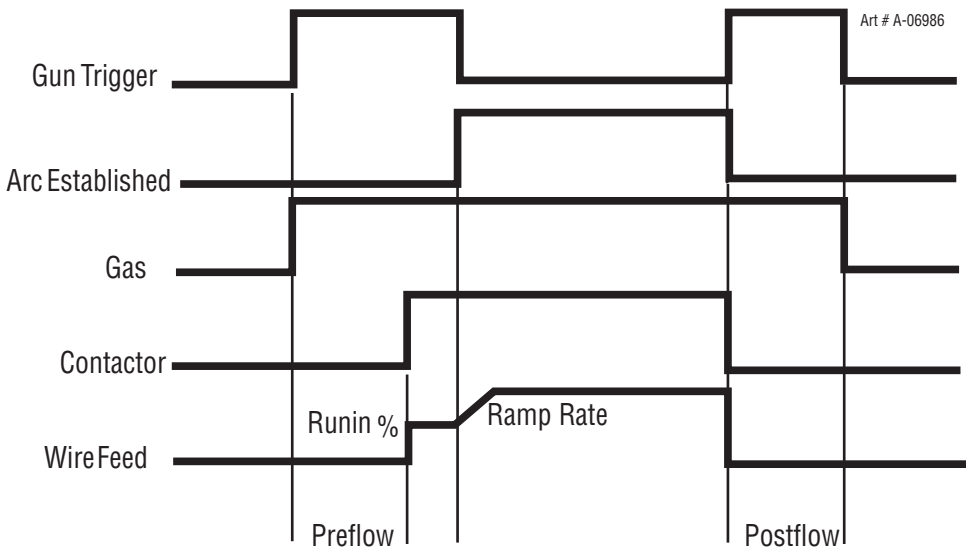


Figure 4-5: Welding - 2 Step Operation

4.08 Welding - 4 Step Operation

Refer to Figure 4-6.

NOTE

When welding in 4 step operation, the Ultrafeed VA 4000 must recognize an arc (based on Arc Established or current feedback from the power source) within 1.5 seconds after the wire begins feeding. If the Ultrafeed VA 4000 receives a gun switch trigger and release while in 4 step operation and no arc is recognized, the Ultrafeed VA 4000 will feed wire for 1.5 seconds and then stop. This is done to prevent the possible injury that could result with the unwanted feeding of wire while not welding.

Position the welding gun above the workpiece and depress the gun switch trigger. The gas will begin to flow. Release the gun switch trigger while maintaining the welding gun in the same position. At this point, the contactor to the power source will enable its output, and the wire will begin feeding, and an arc will get established. The time from releasing the switch to establishing an arc is allowed to be 1.5 seconds, after which the feeder will return to Standby.

To end the weld, depress the gun switch trigger again. The wire will stop feeding, and the power source output will go off. The gas will continue to flow for as long as the gun switch is depressed. Release the gun switch to shut off the gas, ending the postflow period.

NOTE

In 4-Step welding, the user can independently control the amount of preflow and postflow time by adjusting the amount of time the gun switch is depressed.

EXAMPLE:

For no preflow, depress and release the gun switch trigger as quickly as possible. For 5 seconds preflow, depress the gun switch trigger for 5 seconds before releasing the gun switch trigger. The procedure is the same for postflow.

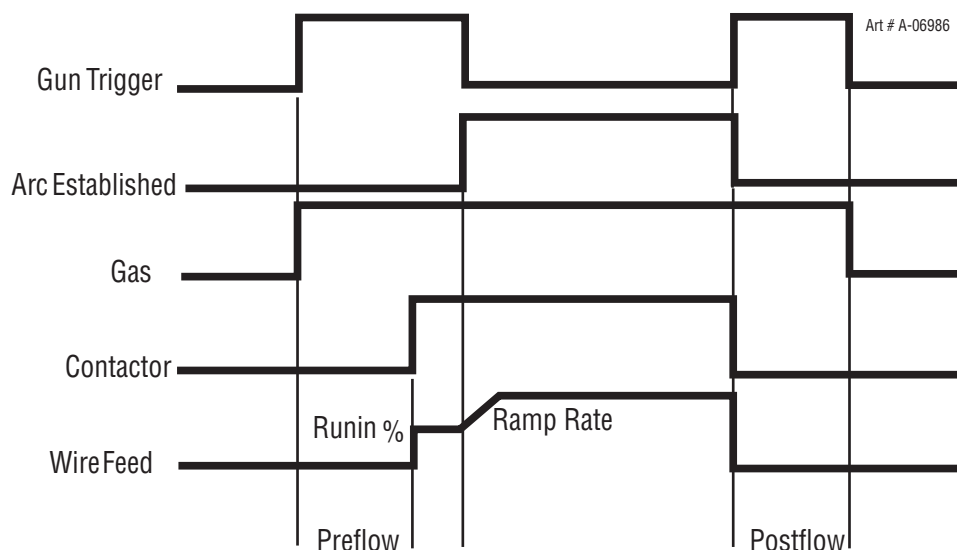


Figure 4-6: Welding - 4 Step Operation

4.09 System DIP Switches

The 870309 Motor Control Board contains a 5 position DIP switch that allows the user to (1) optimize the runin wire feed characteristics for optimal starting, and (2) override the Arc Established signal so that the 4 Step Operation can be used on power sources that do not have an Arc Established signal or current feedback.

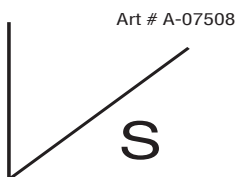
RUN-IN SPEED ADJUSTMENT:



Art # A-07507

The run-in speed adjustment controls the speed the wire approaches the work at. These switches select a percentage of the set speed. The selectable percentages are 25%, 50%, 75% (default), and 100%. For example, if you have 400 IPM set speed, and have 50% selected here, then the speed of the wire will be 200 IPM until an arc gets established. Once an arc is established, the speed ramps to the set speed at the rate set with Ramp Rate as described in the next paragraph.

RAMP RATE ADJUSTMENT:



Art # A-07508

The ramp rate adjustment sets how fast the wire feeder accelerates the wire. This setting is the amount of time it takes to go from 0 to 875 inches per minute. The times are .1, .2 (default), .3, or .4 seconds. This setting works together with the runin speed adjustment to tune the wire starting characteristic with the power source being used to offer optimal starting.

PROCEDURE



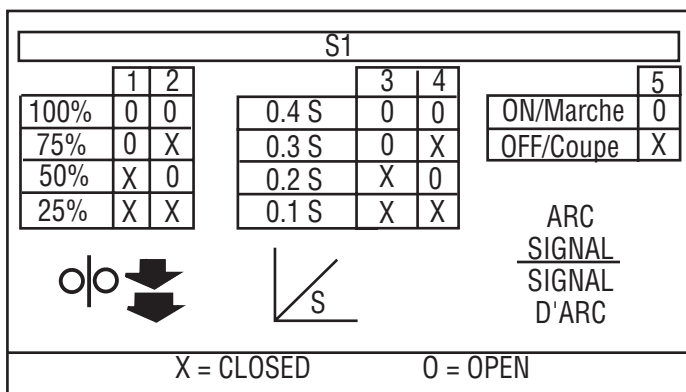
WARNING

ELECTRIC SHOCK CAN KILL. Remove input power from the wire feeder before making an adjustment to the system DIP switches.

Turn the power source and wire feeder power switches OFF. Remove the eight (8) screws holding the sheet metal cover and carefully remove it from the unit. The 870309 Motor Control Board will contain a 5 position DIP switch labelled S1 (Refer to Figure 4-7 below).

To open any of the DIP switches, push the switch toward the word OPEN, which is labelled on the switch. To close any of the DIP switches, push the switch away from the word OPEN.

After the settings have been made, reattach the sheet metal cover and reapply power to the power source and wire feeder.



Art: A-07506

Figure 4-7: System DIP Switch

4.10 PTC Protection of A-B Circuit

The A-B contactor circuit on the Ultrafeed VA 4000 provides a relay closure to the power source through pins A and B of the 19 pin control cable. This allows the welding wire to become electrically 'HOT' when the gun switch trigger on the welding gun is pulled. If this relay closure is NOT provided for any reason, the welding wire WILL NOT be electrically 'HOT'. The wire will feed, but there will be NO arc when the wire touches the work.

The Ultrafeed VA 4000 has a thermal, self reset protection device in the A-B contactor circuit to protect the circuitry against a fault or overload condition. This protection device will only allow a maximum steady state current in the range of 180 to 450 milliamps (dependent on ambient temperature) to flow through pins A and B of the 19 pin control cable to the A-B contactor circuit on the Ultrafeed VA 4000.

If this acceptable current range is exceeded for any reason, the self-reset protection circuit located on the motor control board will be activated effectively disabling the A-B contactor circuit. Once the fault or overload condition has been corrected and the current has returned to an acceptable level, the protection device will automatically reset and normal operation can resume.

NOTE

The protection circuit will remain activated (there will be NO arc when the wire touches the work) as long as the acceptable current range is exceeded.

4.11 Ground Fault Operation

The Ultrafeed VA 4000 has been equipped with a ground fault protection circuit. This protection circuit is activated whenever excessive current flow in the protective earth ground is detected. If the ground fault protection circuit is activated, the yellow FAULT indicator on the front of the feeder will flash at a rate of approximately 1 second on, 1 second off. When a ground fault occurs, the feeder will immediately shut down the feeder, gas valve, and power source contactor. Once the ground fault protection circuit has been set, the wire feeder will not respond to a gun switch closure until the power is reset by turning the feeder off and back on.

NOTE

Before resetting power to the wire feeder after a ground fault occurrence, determine what caused the ground fault and correct the problem before attempting to weld again.

4.12 Electronic Motor Protection

The Ultrafeed VA 4000 utilizes an electronic protection circuit to protect the motor against overcurrent caused by excessive load on the motor. This protection will normally trip if the motor stays in current limit for about 10 seconds. Should this occur, the protection circuit will trip which will cause the FAULT indicator LED to light continuously. In order to reset this condition, cycle power on the unit.

NOTE

Should this condition occur, check the wire feeding path, and make sure that there is not any restrictions or binding on the wire, and that the feedrolls aren't locked by some obstruction.

4.13 Software Features

The Ultrafeed VA 4000 is designed to be upgraded with various options. One of the options (Advanced Interface Kit) allows many features (including timer times, and wire speed limits) to be programmed via one of the serial ports on the feeder through the optional Graphical User Software (GUS) package.

If some of the features on the feeder aren't working correctly, they may have been set to a different value with GUS. To reset the machine to its default state, turn the unit on while holding the gun trigger, and holding the PURGE and INCH buttons in. After about 10 seconds, the unit should be reset to factory defaults.

NOTE

Take wire feed tension off so that the wire will not feed.

4.14 Arc Signal Override

Switch #5 on the motor control board configures the wire feeder for the presence of Arc Established signals from a power source. If the power source has either an Arc Established (as most Thermal Arc power sources have), or a Current Feedback signal has (as most competitive power sources have), then this switch should be CLOSED. If the power source does not have these 'Arc Signals', then this switch should be OPEN. This switch allows the 2 Step / 4 Step and timer features to work, although they will not be timed from the true start of the arc, but instead from when the gun trigger is pulled.

Making a switch adjustment:

To make an adjustment to the system DIP switches, remove the 8 sheet metal screws from the control box and remove the sheet metal cover and door by gently rocking it forward to pull it free from the feeder assembly. Locate the 870309 Motor Control Board on the opposite side of the feeder assembly as shown in Figure 4-8 below. The DIP switches are located at the top of the board as shown. Set switch # 5 according to your set up and replace the cover.

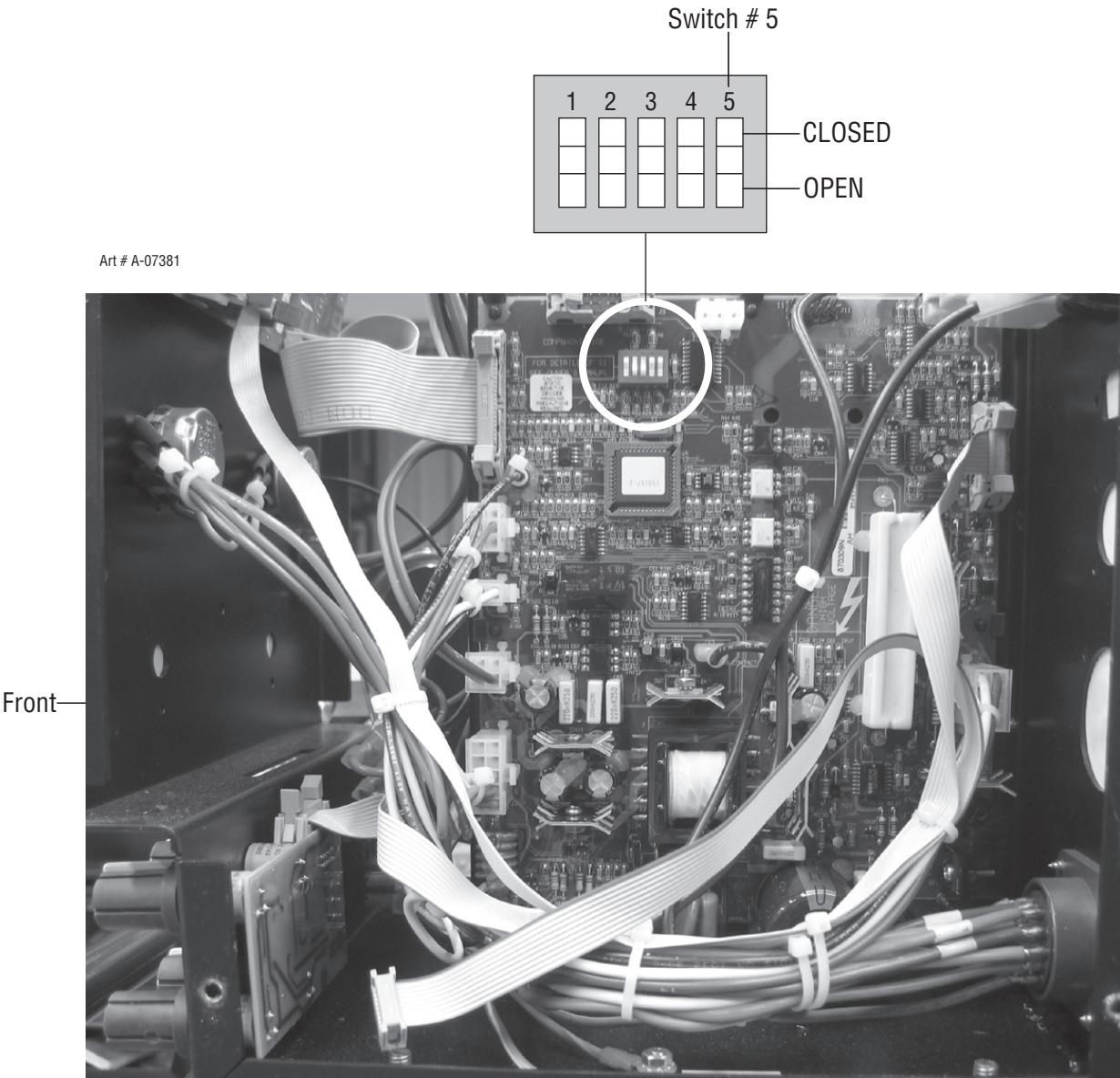


Figure 4-8: Arc Signal Override DIP Switch Location and Settings

SECTION 5: SERVICE

5.01 Cleaning The Unit

Periodically, clean the inside of the wire feeder and feedhead assembly by using a vacuum cleaner or clean, dry compressed air of not more than 25 psi (172 kPa) pressure. After cleaning the unit, check all electrical components for loose or faulty connections and correct if necessary.

Clean the grooves on the lower drive roll frequently. This cleaning operation can be done by using a small wire brush. Also, wipe off or clean the grooves on the upper bearing roll. After cleaning the feed rolls, tighten the feed roll retaining knobs accordingly.

The only point of maintenance in the feedhead assembly is the motor brushes. Inspect these about every 300 hours of operation. When these brushes are worn to about 1/8" (3.2 mm), new brushes should be installed.



CAUTION

Neglect in brush maintenance may cause damage to the motor commutator resulting in a shorter motor operating life.

5.02 Cleaning The Feed Rolls

Clean the grooves on the lower drive roll frequently. This cleaning operation can be done by using a small wire brush. Also, wipe off or clean the grooves on the upper bearing roll. After cleaning the feed rolls, tighten the feed roll retaining knobs accordingly.

5.03 System Maintenance

The user has been given a visual tool in the feed monitor display. Use the feed monitor display in determining when a new contact tip, liner, and/or wire guide is needed.

5.04 Troubleshooting Guide

NOTE

Refer to the Connection Diagram and the Schematic Diagram in the Appendix chapter of this manual for graphical assistance in disassembling and troubleshooting the wire feeder.

Scope

The troubleshooting guide is intended to be used by qualified service technicians. The troubleshooting guide contains information which can be used to diagnose and correct unsatisfactory operation or failure of the various components of the wire feeder. Each symptom of trouble is followed by a list of probable causes and the procedure necessary to correct the problem.

Safety

To ensure safe operation and service, read this entire manual before attempting to service or repair this machine. The service technician may be asked to check voltage levels while the machine is turned ON. To assure safety, use care and follow all instructions accordingly.

5.05 Troubleshooting Guide



WARNING

ELECTRIC SHOCK can kill.

Follow all safety precautions.

Do not touch live electrical parts.

Turn OFF input power before servicing the machine unless otherwise noted.

Only qualified technicians are to service the machine.



WARNINGS

PC boards and their components are static sensitive devices.

Use static proof bags.

Use grounded wrist strap.

Only qualified personnel should test or handle these devices.

Use only genuine replacement parts.

A. Unit is completely inoperative - nothing functions

1. *Connect the 19 pin power source control cable to the power source and wire feeder Amphenol connectors.*
2. *Turn the power source ON.*
3. *Place the power switch of the wire feeder to the ON position.*
4. *Check the ground fault indicator light.*
 - a. *Remove ground fault (refer to Section 4.13 Ground Fault Operation).*
5. *With the power source turned ON, check for 115 VAC at power source amphenol pins E and F.*
 - a. *Refer to the power source owner's manual.*
6. *Check continuity of pins E and F of the 19 pin power source control cable.*
 - a. *Replace the 19 pin power source control cable.*

7. *Check to see why the circuit breaker on the wire feeder power switch trips.*

- a. *Allow a short cool down period before attempting to turn the power switch ON again..*

8. *Check connections on the power switch of the wire feeder for loose or faulty connections.*

- a. *Repair or replace connection.*

B. Wire feed motor operates but wire does not feed or feeds erratically

1. *Check for too little or too much pressure on feed rolls.*
 - a. *Increase or decrease the pressure accordingly with the spring tension knob (refer to Section 3.09 Threading Wire Into Feedhead).*
2. *Check for incorrect feed roll sizes.*
 - a. *Check size stamped on outside of feed roll. Match to wire size.*
3. *Check to see if wire spool tension is too great.*
 - a. *Decrease wire spool tension (refer to Section 3.05 Adjustment Of Spool Tension).*
4. *Check for restriction in welding gun and cable assembly.*
 - a. *Repair or replace gun, cable, liner, or contact tip.*
5. *Check for failed insulator on drive gear assembly — motor shaft turning inside insulator.*
 - a. *Replace drive gear assembly.*

C. Wire wraps around the feed rolls

1. *Check for too much pressure on the welding wire.*
 - a. *Decrease the pressure with the spring tension knob (refer to Section 3.09 Threading Wire Into Feedhead).*
2. *Check alignment of input and output wire guides.*
 - a. *Re-align wire guides (refer to Section 3.06 Input And Output Wire Guide Installation).*
3. *Check to see if correct cable liner and contact tip are being used.*

- a. Refer to Table in welding gun manual for correct size.
- 4. *Worn or damaged contact tip.*
 - a. Replace contact tip. Refer to Options and Accessories chart in the Appendix section of this manual.

D. Wire does not feed with gun switch depressed

1. *Check the ground fault indicator light.*
 - a. Remove ground fault (refer to Section 4.13 Ground Fault Operation).
2. *Check the continuity of the welding gun trigger leads with the trigger depressed.*
 - a. Repair or replace the welding gun.
3. *Check the gun switch receptacle located on the feeder for loose or faulty connections.*
 - a. Repair or replace connection.
4. *Check the motor lead connections for loose or faulty connections.*
 - a. Repair or replace connection.
5. *Check for a blown fuse on the motor control PC board.*
 - a. Replace the blown fuse (refer to Section 4.11 Replacing Motor Fuse).

E. Motor continues to run after gun switch has been released

1. *Check to see if wire feeder is in proper mode (two step or four step).*
 - a. Refer to the Operation Section 4 in this manual.
2. *Check for shorted welding gun trigger leads.*
 - a. Repair or replace welding gun.
3. *Check for shorted gun switch receptacle located on the wire feeder.*
 - a. Remove the short.

F. No wire feed speed (WFS) control

1. *Check for a loose WFS control knob.*
 - a. Tighten the WFS control knob.
2. *Make sure the ribbon cable assembly is connected to both J1 of the display PC board assembly and J1 of the motor control board assembly.*
 - a. Repair or replace ribbon cable assembly.

3. *With the power switch ON, measure the DC voltage on the motor control PC board from FT2-5 (+) to FT1-5 (-) while adjusting the WFS control knob. The reading should vary from approximately 1 to 10 vdc.*

- a. Replace the display PC board.

G. No arc voltage (VOLTS) control

1. *Make sure the local/remote switch on the power source is in the remote position.*
 - a. Refer to the power source owner's manual.
2. *Check for a loose VOLTS control knob.*
 - a. Tighten the VOLTS control knob.
3. *Make sure the ribbon cable assembly is connected to both J1 of the display PC board assembly and J1 of the motor control board assembly.*
 - a. Repair or replace ribbon cable assembly.

H. Wire does not feed with INCH button depressed

1. *Check the INCH/PURGE switch located on the wire feeder for loose or faulty connections.*
 - a. Repair or replace connections.

I. Gas does not flow with PURGE button depressed

1. *Check the INCH/PURGE switch located on the wire feeder for loose or faulty connections.*
 - a. Repair or replace connection.

J. Feed Monitor Display does not function

1. *Make sure the ribbon cable assembly is connected to both J1 of the display PC board assembly and J1 of the motor control board assembly.*
 - a. Repair or replace ribbon cable assembly.

K. Wire feeds but no gas flows

1. *Check to see if the gas cylinder is empty or the valve closed.*
 - a. Replace gas cylinder or open valve and adjust flowmeter.
2. *Check for a possible restriction in the gas line or gas valve.*
 - a. Remove restriction.
3. *Check to see if the welding gun nozzle is plugged.*
 - a. Clean the welding gun nozzle.
4. *Check the connections on the gas valve for loose or faulty connections.*
 - a. Repair or replace connection.

L. Gas flows all the time or leaks

1. *Make sure all connections are tight.*
2. *Check for foreign material inside the gas valve.*

M. Wire feeds but electrode wire is not hot – there is no arc

1. *Check continuity of pins A and B of the 19 pin power source control cable.*
 - a. Replace the 19 pin power source control cable.
2. *Make sure the power source control cable is not damaged. A damaged power source control cable could be activating a protection circuit on the motor control PC board.*
 - a. Refer to Section 4.12 Protection Of A-B Circuit.

SECTION 6: PARTS LISTS

6.01 Equipment Identification

All identification numbers as described in the Introduction chapter must be furnished when ordering parts or making inquiries. This information is found on the nameplate attached to the equipment. Be sure to include any dash numbers following the Specification or Assembly numbers.

PART NUMBER

W3400001

6.02 How To Use This Parts List

The Parts List is a combination of an illustration (Figure Number) and a corresponding list of parts which contains a breakdown of the equipment into assemblies, subassemblies, and detail parts. All user-serviceable parts are listed except for commercially available hardware, bulk items such as wire, cable, sleeving, tubing, etc. The part descriptions may be indented to show part relationships.

To determine the part number, description, quantity, or application of an item, locate the item in question from the illustration and refer to that item number in the corresponding Parts List.

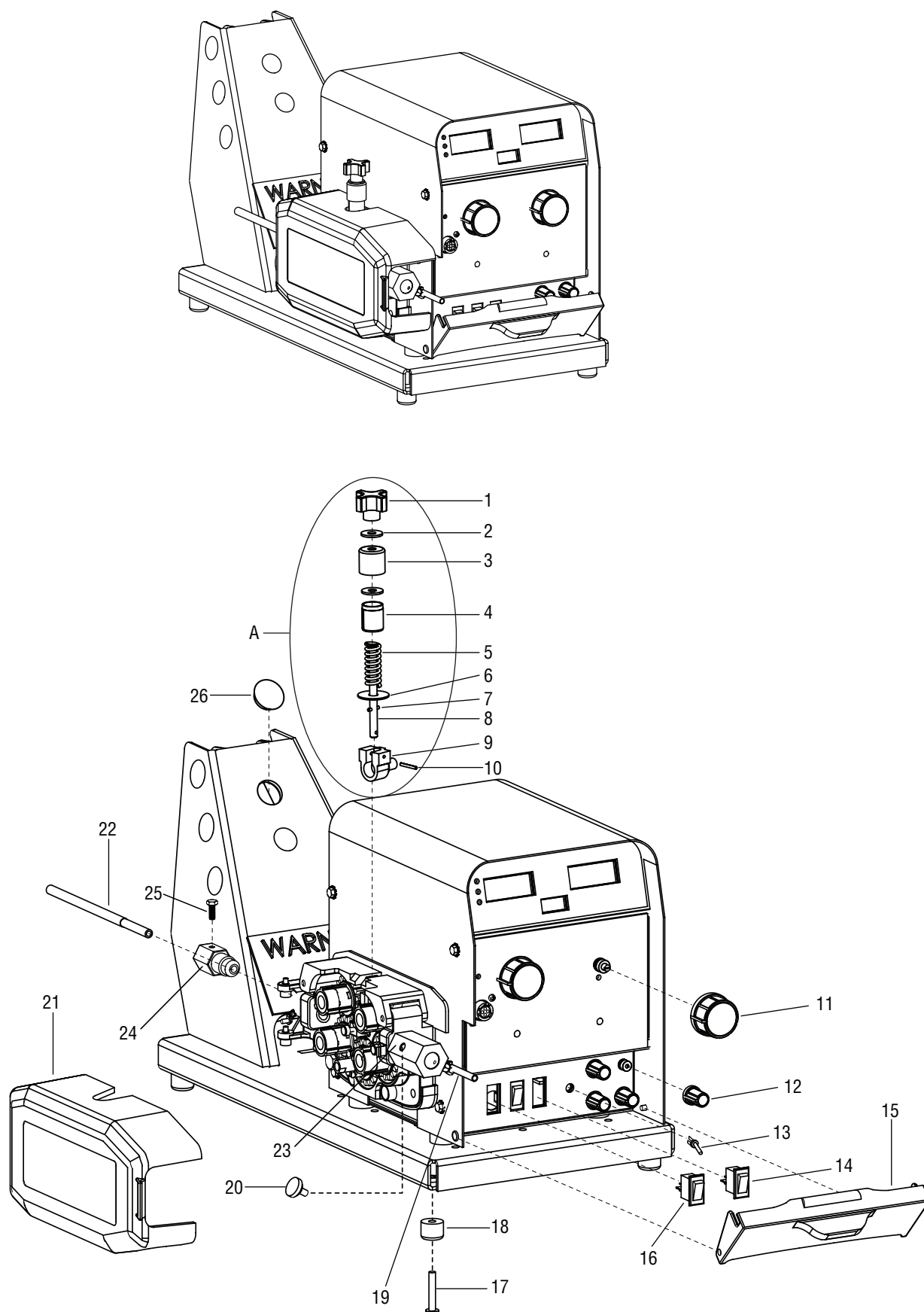
ULTRA FEED VA 4000

6.03 Replacement Parts - Front

Item #	Qty	Description	Catalog #
A	1	Rod, Tension Subassembly, WF	870504
A1	1	Knob,Control,1/4" IDx3/4"	870082
A2	2	Washer,6.4mm,Flat	See Note 1
A3	1	Insulator, Plastic Top , WF	870424
A4	1	Insulator, Plastic Bottom, WF	870427
A5	1	Spring,Pressure Adj,2R Plate	400562-033
A6	1	Washer,1/4" IDx0.73" OD,Flat	See Note 1
A7	1	Pin, Roll, 3/32" ODx1/2"	7962029PKD
A8	1	Rod,Tension Arm,2R & 4R Plate	870425
A9	1	Tension Arm, U Bushing, WF	870511
A10	1	Pin, Roll, 0.1" ODx.75"	7962034PKD
11	2	Knob, Control, 1/4" IDx1.65"	870696
12	4	Knob,Control, .125" IDx.57" OD	870734
13	1	Switch, Toggle	Fitted to PCB3
14	2	Switch, Rocker,SP, WF	870359
15	1	Door, UltraFeed 4000, WF	871346WBLKPKD
16	2	Switch, Rocker,SP,Mom, WF	870358
17	4	Bolt, M6 x 19mm, WF	See Note 1
18	4	Foot, 1" OD Rubber .600", WF	NB1636PKD
20	1	Knob, Torch Locking	10-6187
21	1	Cover, Left Feedhead, WF	870687PKD
22	1	Spring, Input , WF	376037
23	1	Adapter, Gun TWECO, WF	870948
24	1	Guide, Input, WF	406397
25	1	Screw,PHCR,#10-24x1/2"	See Note 1
26	2	Plug, Lifting Eye Hole, WF	870716PKD

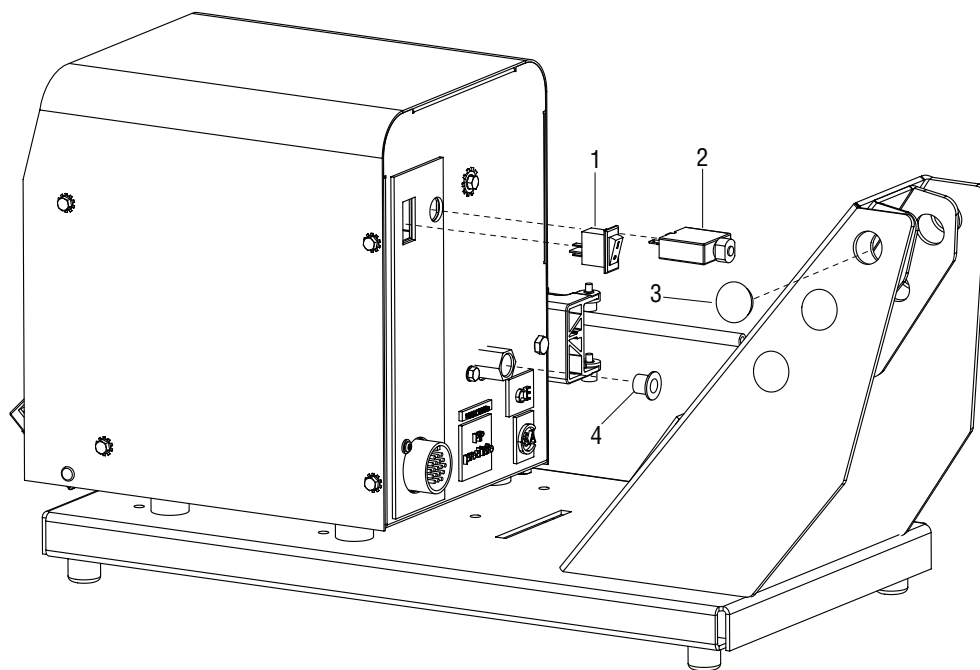
Note 1

This part is available at any hardware store.



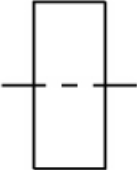
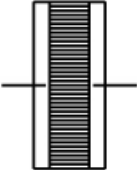
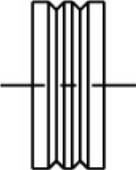
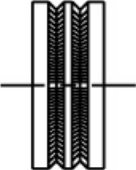
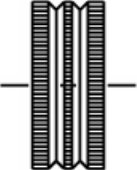
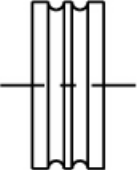
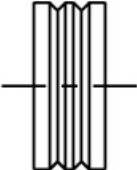
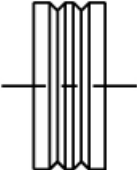
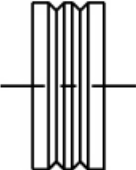
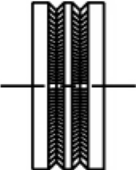
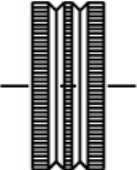
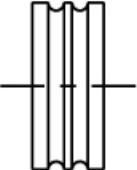
6.04 Replacement Parts - Rear

Item #	Qty	Description	Catalog #
1	1	Switch, Rocker,SP, WF	870367
2	1	Circuit Breaker, 4A, WF	203627-009
3	6	Plug, Black Nylon Snap, WF	870716PKD
4	1	Cap, Dust, WF	402128-010



APPENDIX 1: FEED ROLL KITS

DRIVE ROLL KITS (#375980-Series) 4 ROLL

FEED ROLL STYLES						
STYLE 1 SMALL HARD WIRE	STYLE 2 HARD WIRE	STYLE 3 SOFT WIRE	STYLE 4 HARD & TUBULAR WIRE	STYLE 5 TUBULAR WIRE	STYLE 6 SOFT WIRE	
FLAT	FLAT KNURLED	DOUBLE SMOOTH VEE	DOUBLE KNURLED VEE	DOUBLE COG	DOUBLE "U"	
						
						
DOUBLE SMOOTH VEE	DOUBLE SMOOTH VEE	DOUBLE SMOOTH VEE	DOUBLE KNURLED VEE	DOUBLE COG	DOUBLE "U"	
Style 1	Style 2	Style 3	Style 4	Style 5	Style 6	
Top	Flat	Flat Knurled	Double Smooth "V"	Double Knurled "V"	Double Cog	Double "U"
Bottom	Double Smooth "V"	Double Smooth "V"	Double Smooth "V"	Double Knurled "V"	Double Cog	Double "U"
Wire Type	Hard	Hard	Soft/Hard/Tubular	Hard/Tubular	Tubular	Soft (Aluminum)
Wire Size						
.024" / 0.6mm	375980-071	-	-	-	-	-
.030", .035" / 0.8, 0.9mm	375980-041	375980-043	375980-050	-	-	-
.030", .035", .045" / 0.8, 0.9, 1.2mm	375980-068*	375980-069	-	-	-	-
.035" / 0.9mm	375980-080*	-	375980-050	-	-	375980-072
.035", .045" 3/64" / 0.9, 1.2, 1.2mm	-	-	375980-070	-	-	-
.045" / 1.2mm	375980-042*	375980-044	-	375980-083	375980-062	-
3/64 / 1.2mm	-	-	375980-051	-	-	375980-073
.052" / 1.3mm	375980-081*	-	-	-	-	-
.052", 1/16" / 1.3, 1.6mm	-	-	375980-052	375980-057	375980-083	-
1/16" / 1.6mm	375980-045*	-	-	-	-	375980-074
.068" / 1.7mm	-	-	-	375980-057	-	-
5/64" / 2.0mm	375980-046*	-	-	375980-058	375980-064	-
3/32" / 2.4mm	-	-	-	375980-059	375980-065	-
7/64" / 2.8mm	-	-	-	375980-060	375980-066	-
1/8" / 3.2mm	-	-	-	375980-061	375980-067	-

Notes: 1) One Kit is supplied standard with each wire feeder (two kits with dual).

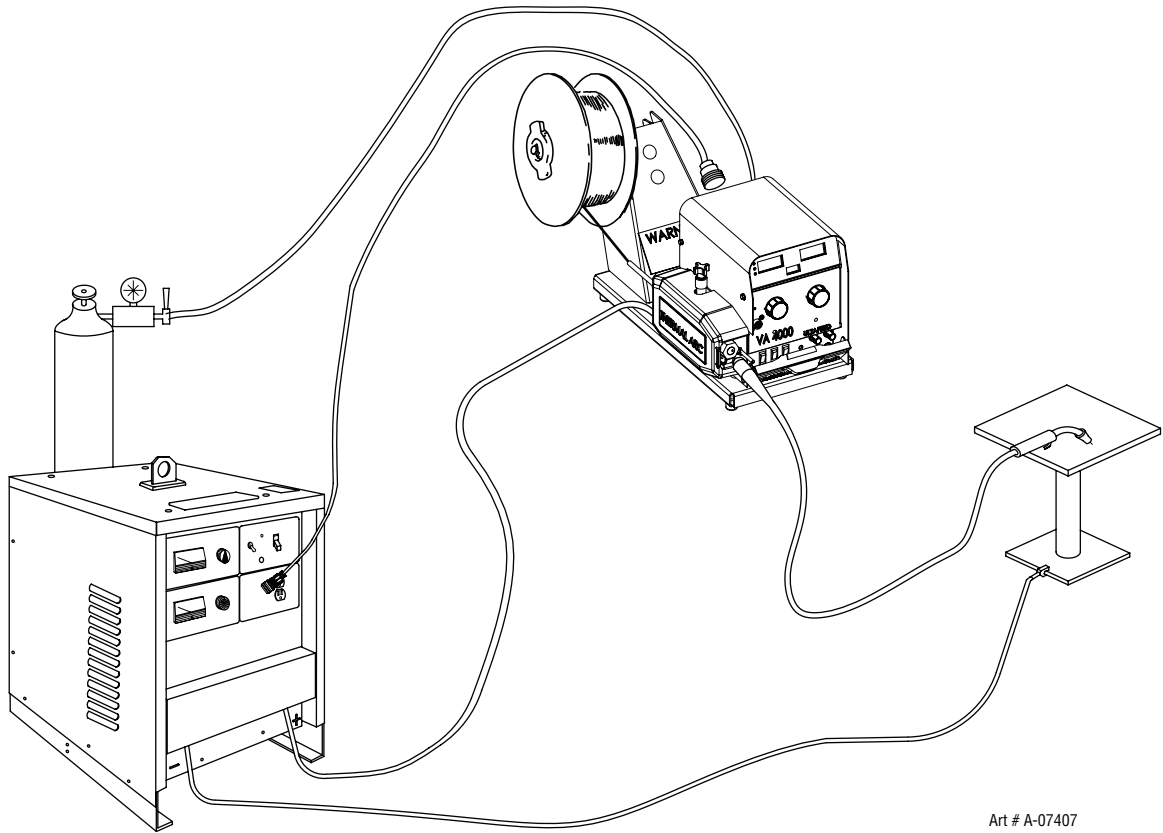
2) Drive Roll Kits include: Drive Rolls; Input, Output & Center Guides

3) Narrow 30° "V"

APPENDIX 2: OPTIONS AND ACCESSORIES

<i>KITS</i>	<i>PART NO.</i>	<i>DESCRIPTION</i>
Dual Schedule Kit	W4008001	Provides a second schedule for wire feed speed and voltage
Advanced Interface Kit	870379	19 pin plug; start/stop; schedule select; inch & purge inputs; arc standby & fault outputs; 0-10VDC analog input
<i>ACCESSORIES</i>		
Drive Roll Kits	375980-XXX	One kit (#375980-083) is supplied standard with each wire feeder, see drive roll kit chart to select a different drive roll style
Control Cable 6 ft (1.8m)	374878-006	Control cable from wire feeder to power source (A 6ft.control cable #374878-006 is supplied with the wire feeder)
15ft (4.5m)	374878-015	
25ft (7.6m)	374878-025	
50ft (15.2m)	374878-050	
100ft (30.5m)	374878-100	
Interconnect Cable Assembly		Complete interconnect assembly from wire feeder to power source, includes control cable, welding power cable and gas hose in a sheathed cover.
6 ft (1.8m)	W4009200	
15ft (4.5m)	W4009201	
25ft (7.6m)	W4009202	
50ft (15.2m)	W4009203	
Wire Spool Adaptor 10 lb (4.5kg), 8" spool	375585-001	
15 lb (6.8kg), 8" spool	375864-001	
Spool Cover 30 lb (13.6kg) spool	375582A-004	
60 lb (27.2kg) spool	375733A-001	
Wire Reel Kit	870059	
Wire Coil Adaptor 14 lb (6.4kg) coil	375942A	
60 lb (27.3kg) coil	407142A	
Wire Feeder Cart	W4000001	
Lift Eye Kit	W4002001	Electrically isolated
MIG Gun Adaptor Kits Tweco® #5	870395	
Miller®	870397	
Euro-style	171449	
Cable Adapters 19 pin wire feeder to 5 pin power source	870000-001	For older style power sources
19 pin wire feeder to 14 pin power source	870093B-001	For Miller® or 14 pin style power sources

APPENDIX 3: SYSTEM OUTLINE



LIMITED WARRANTY

This information applies to Thermal Arc products that were purchased in the USA and Canada.

April 2006

LIMITED WARRANTY: Thermal Arc[®], Inc., A Thermadyne Company ("Thermal Arc"), warrants to customers of authorized distributors ("Purchaser") that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the warranty period stated below, Thermal Arc shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with Thermal Arc's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or damage, correct such defects by suitable repair or replacement, at Thermal Arc's sole option, of any components or parts of the product determined by Thermal Arc to be defective.

This warranty is exclusive and in lieu of any warranty of merchantability, fitness for any particular purpose, or other warranty of quality, whether express, implied, or statutory.

Limitation of liability: Thermal Arc shall not under any circumstances be liable for special, indirect, incidental, or consequential damages, including but not limited to lost profits and business interruption. The remedies of the purchaser set forth herein are exclusive, and the liability of Thermal Arc with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by Thermal Arc, whether arising out of contract, tort, including negligence or strict liability, or under any warranty, or otherwise, shall not exceed the price of the goods upon which such liability is based.

No employee, agent, or representative of Thermal Arc is authorized to change this warranty in any way or grant any other warranty, and Thermal Arc shall not be bound by any such attempt. Correction of non-conformities, in the manner and time provided herein, constitutes fulfillment of thermal's obligations to purchaser with respect to the product.

This warranty is void, and seller bears no liability hereunder, if purchaser used replacement parts or accessories which, in Thermal Arc's sole judgment, impaired the safety or performance of any Thermal Arc product. Purchaser's rights under this warranty are void if the product is sold to purchaser by unauthorized persons.

The warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date Thermal Arc delivered the product to the authorized distributor.

Warranty repairs or replacement claims under this limited warranty must be submitted to Thermal Arc via an authorized Thermal Arc repair facility within thirty (30) days of purchaser's discovery of any defect. Thermal Arc shall pay no transportation costs of any kind under this warranty. Transportation charges to send products to an authorized warranty repair facility shall be the responsibility of the Purchaser. All returned goods shall be at the Purchaser's risk and expense. This warranty dated April 1st 2006 supersedes all previous Thermal Arc warranties. Thermal Arc[®] is a Registered Trademark of Thermal Arc, Inc.

WARRANTY SCHEDULE

This information applies to Thermal Arc products that were purchased in the USA and Canada.

April 2006

ENGINE DRIVEN WELDERS	WARRANTY PERIOD	LABOR
Scout, Raider, Explorer		
Original Main Power Stators and Inductors	3 years	3 years
Original Main Power Rectifiers, Control P.C. Boards	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, power switch semi-conductors	1 year	1 year
Engines and associated components are NOT warranted by Thermal Arc, although most are warranted by the engine manufacturer	See the Engine's Warranty for Details	
GMAW/FCAW (MIG) WELDING EQUIPMENT	WARRANTY PERIOD	LABOR
Fabricator 131, 181; 190, 210, 251, 281; Fabstar 4030; PowerMaster 350, 350P, 500, 500P; Excelarc 6045.		
Wire Feeders; Ultrafeed, Portafeed		
Original Main Power Transformer and Inductor	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors	1 year	1 year
GTAW (TIG) & MULTI-PROCESS INVERTER WELDING EQUIPMENT	WARRANTY PERIOD	LABOR
160TS, 300TS, 400TS, 185AC/DC, 200AC/DC, 300AC/DC, 400GTSW, 400MST, 300MST, 400MSTP		
Original Main Power Magnetics	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors	1 year	1 year
PLASMA WELDING EQUIPMENT	WARRANTY PERIOD	LABOR
Ultima 150		
Original Main Power Magnetics	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	3 years	3 years
Welding Console, Weld Controller, Weld Timer	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors, Coolant Recirculator	1 year	1 year
SMAW (Stick) WELDING EQUIPMENT	WARRANTY PERIOD	LABOR
Dragster 85		
Original Main Power Magnetics	1 year	1 year
Original Main Power Rectifiers, Control P.C. Boards	1 year	1 year
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, power switch semi-conductors	1 year	1 year
160S, 300S, 400S		
Original Main Power Magnetics	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, power switch semi-conductors	1 year	1 year
GENERAL ARC EQUIPMENT	WARRANTY PERIOD	LABOR
Water Recirculators	1 year	1 year
Plasma Welding Torches	180 days	180 days
Gas Regulators (Supplied with power sources)	180 days	Nil
MIG and TIG Torches (Supplied with power sources)	90 days	Nil
Replacement repair parts	90 days	Nil
MIG, TIG and Plasma welding torch consumable items	Nil	Nil



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