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M.K. Form Number	PG/SG
NWSA Form Number	550
Effective with Serial Number	01000
Voltage Rating	24 VDC
Printing/Revision Date	July 1996
This manual applies to the following Torch Model Numbers	145-xxx 146-xxx

OWNERS MANUAL

Prince Torch/Spool Gun



PRINCE[®]
MODEL NO'S. 145 & 146

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SAFETY CONSIDERATIONS

ELECTRIC ARC WELDING EQUIPMENT

CAUTION : READ BEFORE ATTEMPTING INSTALLATION, OPERATION OR MAINTENANCE OF THIS EQUIPMENT

1-1 INTRODUCTION

This equipment is intended for ultimate application by commercial/industrial users and for operation by persons trained and experienced in the use and maintenance of welding equipment. Operation should not be undertaken without adequate training in the use of such equipment. Training is available from many public and private schools or similar facilities.

Safe practices in the installation, operation and maintenance of this equipment requires proper training in the art, a careful study of the information provided with the equipment, and the use of common sense. Rules for safe use are generally provided by suppliers of welding power sources, compressed gas suppliers, and electrode suppliers. Careful compliance with these rules will promote safe use of this equipment.

The following Safety Rules cover some of the more generally found situations. READ THEM CAREFULLY. In case of any doubt, obtain qualified help before proceeding.

1-2 GENERAL PRECAUTIONS

A. Burn Prevention

ELECTRIC ARC WELDING PRODUCES HIGH INTENSITY HEAT AND ULTRA-VIOLET RADIANT ENERGY WHICH MAY CAUSE SERIOUS AND PERMANENT EYE DAMAGE AND WHICH MAY DAMAGE ANY EXPOSED SKIN AREAS.

Wear helmet with safety goggles or glasses with side shields underneath, appropriate filter lenses or plates (protected by clear cover glass). This is a must for welding or cutting (and chipping) to protect the eyes from radiant energy and flying metal. Replace cover glass when broken, pitted, or spattered.

Medical first aid and eye treatment. First aid facilities and a qualified first aid person should be available for each shift unless medical facilities are close by for immediate treatment of flash burns of the eyes and skin burns.

Wear protective clothing - leather (or asbestos) gauntlet gloves, hat, and high safety-toe shoes. Button shirt collar and pocket flaps, and wear cuffless trousers to avoid entry of sparks and slag.

Avoid oily or greasy clothing. A spark may ignite them.

Flammable hair preparations should not be used by persons intending to weld or cut.

Hot metal such as electrode stubs and work pieces should never be handled without gloves.

Ear plugs should be worn when working on overhead or in a

confined space. A hard hat should be worn when others work overhead.

B. Toxic Fume Prevention

Adequate ventilation. Severe discomfort, illness or death can result from fumes, vapors, heat, or oxygen enrichment or depletion that welding (or cutting) may produce. Prevent them with adequate ventilation. NEVER ventilate with oxygen.

Lead-, cadmium-, zinc-, mercury-, beryllium-bearing and similar materials, when welded or cut, may produce harmful concentrations of toxic fumes. Adequate local exhaust ventilation must be used, or each person in the area, as well as the operator, must wear an air-supplied respirator. For beryllium, both must be used.

Metals coated with or containing materials that emit toxic fumes should not be heated unless coating is removed from the work surface, the area is well ventilated, or the operator wears an air-supplied respirator.

Work in a confined space only while it is being ventilated and, if necessary, while wearing an air-supplied respirator.

Gas leaks in a confined space should be avoided. Leaked gas in large quantities can change oxygen concentration dangerously. Do not bring gas cylinders into a confined space.

Leaving confined space, shut OFF gas supply at source to prevent possible accumulation of gases in the space if downstream valves have been accidentally opened or left open. Check to be sure that the space is safe before re-entering it.

Vapors from chlorinated solvents can be decomposed by the heat of the arc (or flame) to form PHOSGENE, a highly toxic gas, and other lung and eye irritating products. The ultraviolet (radiant) energy of the arc can also decompose trichloroethylene and perchloroethylene vapors to form phosgene. DO NOT WELD or cut where solvent vapors can be drawn into the welding or cutting atmosphere or where the radiant energy can penetrate to atmospheres containing even minute amounts of trichloroethylene or perchloroethylene.

C. Fire and Explosion Prevention

Causes of fire and explosion are: combustibles reached by the arc, flame, flying sparks, hot slag, or heated material, misuse of compressed gases and cylinders, and short circuits.

BE AWARE THAT flying sparks or falling slag can pass through cracks, along pipes, through windows or doors, and through wall or floor openings, out of sight of the goggled operator. Sparks can fly many feet.

To prevent fires and explosion:

Keep equipment clean and operable, free of oil, grease, and (in electrical parts) of metallic particles that can cause short circuits.

If combustibles are in area, do NOT weld or cut. Move the work if practicable, to an area free of combustibles. Avoid paint spray rooms, dip tanks, storage areas, ventilators. If the work cannot be moved, move combustibles at least 35 feet away, out of reach of sparks and heat; or protect against ignition with suitable and snug-fitting, fire-resistant covers or shields.

Walls touching combustibles on opposite sides should not be welded on (or cut). Walls, ceilings, and floor near work should be protected by heat-resistant covers or shields.

Fire watcher must be standing by with suitable fire extinguishing equipment during and for some time after welding or cutting if:

- a. appreciable combustibles (including building construction) are within 35 feet.
- b. appreciable combustibles are further than 35 feet, but can be ignited by sparks.
- c. openings (concealed or visible) in floors or walls within 35 feet may expose combustibles to sparks.
- d. combustibles adjacent to walls, ceilings, roofs, or metal partitions can be ignited by radiant or conducted heat.

Hot work permit should be obtained before operation to ensure supervisor's approval that adequate precautions have been taken.

After work is done, check that area is free of sparks, glowing embers, and flames.

An empty container that held combustibles, or that can produce flammable or toxic vapors when heated, must never be welded on or cut, unless container has first been cleaned in accordance with industry standards.

This includes: a thorough steam or caustic cleaning (or a solvent of water washing, depending on the combustible's solubility), followed by purging and inerting with nitrogen or carbon dioxide, and using protective equipment.

Water-filling just below working level may substitute for inerting.

A container with unknown contents should be cleaned (see paragraph above). Do NOT depend on sense of smell or sight to determine if it is safe to weld or cut.

Hollow castings or containers must be vented before welding or cutting. They can explode.

Explosive atmospheres. NEVER weld or cut where the air may contain flammable dust, gas, or liquid vapors (such as gasoline).

D. Compressed Gas Equipment

The safe handling of compressed gas equipment is detailed in numerous industry publications. The following general rules cover many of the most common situations.

1. Pressure Regulators

Regulator relief valve is designed to protect only the regulator from over-pressure; it is not intended to protect any downstream equipment. Provide such protection with one or more relief devices.

Never connect a regulator to a cylinder containing gas other than that for which the regulator was designed.

Remove faulty regulator from service immediately for repair (first close cylinder valve). The following symptoms indicate a faulty regulator:

Leaks - if gas leaks externally.

Excessive Creep - if delivery pressure continues to rise with downstream valve closed.

Faulty Gauge - if gauge pointer does not move off stop pin when pressurized, nor returns to stop pin after pressure release.

Repair. Do NOT attempt repair. Send faulty regulators for repair to manufacturer's designated repair center, where special techniques and tools are used by trained personnel.

2. Cylinders

Cylinders must be handled carefully to prevent leaks and damage to their walls, valves, or safety devices:

Avoid electrical circuit contact with cylinders including third rails, electrical wires, or welding circuits. They can produce short circuit arcs that may lead to a serious accident. (See 1-3C)

ICC or DOT marking must be on each cylinder. It is an assurance of safety when the cylinder is properly handled.

Identifying gas content. Use only cylinders with name of gas marked on them; do not rely on color to identify gas content. Notify supplier if unmarked. NEVER DEFACE or alter name, number, or other markings on a cylinder. It is illegal and hazardous.

Empties: Keep valves closed, replace caps securely; mark MT; keep them separate from FULLS, and return promptly.

Prohibited use. Never use a cylinder or its contents for other than its intended use, NEVER as a support or roller.

Locate or secure cylinders so they cannot be knocked over.

Passageways and work areas. Keep cylinders clear of areas where they may be stuck.

Transporting cylinders. With a crane, use a secure support such as a platform or cradle. Do NOT lift cylinders off the ground by their valves or caps, or by chains, slings, or magnets.

Do NOT expose cylinders to excessive heat, sparks, slag, and flame, etc. that may cause rupture. Do not allow contents to exceed 55 degrees C (130 degrees F.) Cool with water spray where such exposure exists.

Protect cylinders, particularly valves from bumps, falls, falling objects, and weather. Replace caps securely when moving cylinders.

Stuck valve. Do NOT use a hammer or wrench to open a cylinder valve that cannot be opened by hand. Notify your supplier.

Mixing gases. NEVER try to mix any gases in a cylinder.

NEVER refill any cylinder.

Cylinder fittings should never be modified or exchanged.

3. Hose

Prohibited use. Never use hose other than that designed for the specified gas. A general hose identification rule is: red for fuel gas, green for oxygen, and black for inert gases.

Use ferrules or clamps designed for the hose (not ordinary wire or

other substitute) as a binding to connect hoses to fittings.

No copper tubing splices. Use only standard brass fittings to splice hose.

Avoid long runs to prevent kinks and abuse. Suspend hose off ground to keep it from being run over, stepped on, or otherwise damaged.

Coil excess hose to prevent kinks and tangles.

Protect hose from damage by sharp edges, and by sparks, slag, and open flame.

Examine hose regularly for leaks, wear, and loose connections. Immerse pressured hose in water; bubbles indicate leaks

Repair leaky or worn hose by cutting area out and splicing. Do NOT use tape.

4. Proper Connections

Clean cylinder valve outlet of impurities that may clog orifices and damage seats before connecting regulator. Except for hydrogen, crack valve momentarily, pointing outlet away from people and sources of ignition. Wipe with a clean, lintless cloth.

Match regulator to cylinder. Before connecting, check that the regulator label and cylinder marking agree, and that the regulator inlet and cylinder outlet match. NEVER Connect a regulator designed for a particular gas or gases to a cylinder containing any other gas.

Tighten connections. When assembling threaded connections, clean and smooth seats where necessary. Tighten. If connection leaks, disassemble, clean, and re-tighten, using properly fitting wrench.

Adapters. Use a CGA adapter (available from your supplier) between cylinder and regulator, if one is required. Use two wrenches to tighten adapter marked RIGHT and LEFT HAND threads.

Regulator outlet (or hose) connections may be identified by right hand threads for oxygen and left hand threads (with grooved hex on nut or shank) for fuel gas.

5. Pressurizing Steps:

Drain regulator of residual gas through suitable vent before opening cylinder (or manifold valve) by turning adjusting screw in (clockwise). Draining prevents excessive compression heat at high pressure seat by allowing seat to open on pressurization. Leave adjusting screw engaged slightly on single-stage regulators.

Stand to side of regulator while opening cylinder valve.

Open cylinder valve slowly so that regulator pressure increases slowly. When gauge is pressurized (gauge reaches regulator maximum) leave cylinder valve in following position: for oxygen and inert gases, open fully to seal stem against possible leak; for fuel gas, open to less than one turn to permit quick emergency shutoff.

Use pressure charts (available from your supplier) for safe and efficient recommended pressure settings on regulators.

Check for leaks on first pressurization and regularly thereafter. Brush with soap solution. Bubbles indicate leaks. Clean off soapy water after test; dried soap is combustible.

E. User Responsibilities

Follow all Safety Rules.

Remove leaky or defective equipment from service immediately for repair. Read and follow user manual instructions.

F. Leaving Equipment Unattended

Close gas supply at source and drain gas.

G. Rope Staging-Support

Rope staging-support should not be used for welding or cutting operation; rope may burn.

1-3 ARC WELDING

Comply with precautions in 1-1, 1-2, and this section. Arc Welding, properly done, is a safe process, but a careless operator invites trouble. The equipment carries high currents at significant voltages. The arc is very bright and hot. Sparks fly, fumes rise, ultraviolet and infrared energy radiates, weldments are hot, and compressed gases may be used. The wise operator avoids unnecessary risks and protects himself and others from accidents.

A. Burn Protection

Comply with precautions in 1-2.

The welding arc is intense and visibly bright. Its radiation can damage eyes, penetrate lightweight clothing, reflect from light-colored surfaces, and burn the skin and eyes. Skin burns resemble acute sunburn; those from gas-shielded arcs are more severe and painful. DON'T GET BURNED; COMPLY WITH PRECAUTIONS.

1. Protective Clothing

Wear long-sleeve clothing in addition to gloves, hat, and shoes. As necessary, use additional protective clothing such as leather jacket or sleeves, flame-proof apron, and fire-resistant leggings. Avoid outer garments of untreated cotton.

Bare skin protection. Wear dark, substantial clothing. Button collar to protect chest and neck, and button pockets to prevent entry of sparks.

2. Eye and Head Protection

Protect eyes from exposure to arc. Eyes may be damaged by radiant energy when exposed to the electric arc, even when not looking in the direction of the arc. Never look at an electric arc without protection.

Welding helmet or shield containing a filter plate shade no. 12 or denser must be used when welding. Place over face before striking arc.

Protect filter plate with a clear cover plate.

Cracked or broken helmet or shield should NOT be worn; radiation can be passed through to cause burns.

Cracked, broken, or loose filter plates must be replaced IMMEDIATELY. Replace clear cover plate when broken, pitted, or spattered.

Flash goggles with side shields MUST be worn under the helmet to give some protection to the eyes should the helmet not be lowered over the face before an arc is struck. Looking at an arc momentarily with unprotected eyes (particularly a high intensity

gas-shielded arc) can cause a retinal burn that may leave a permanent dark area in the field of vision.

3. Protection of Nearby Personnel

Enclose the welding area. For production welding, a separate room or enclosed bay is best. In open areas, surround the operation with low-reflective, non-combustible screens or panels. Allow for free air circulation, particularly at floor level.

Viewing the weld. Provide face shields for all persons who will be looking directly at the weld.

Others working in area. See that all persons are wearing flash goggles.

Before starting to weld, make sure that screen flaps or bay doors are closed.

B. Toxic Fume Prevention

Comply with precautions in 1-2B.

Generator engine exhaust must be vented to the outside air. Carbon monoxide can kill.

C. Fire and Explosion Prevention

Comply with precautions in 1-2C.

Equipment's rated capacity. Do not overload arc welding equipment. It may overheat cables and cause a fire.

Loose cable connections may overheat or flash and cause a fire.

Never strike an arc on a cylinder or other pressure vessel. It creates a brittle area that can cause a violent rupture or lead to such a rupture later under rough handling.

D. Compressed Gas Equipment

Comply with precautions in 1-2D.

E. Shock Prevention

Exposed electrically hot conductors or other bare metal in the welding circuit, or in ungrounded, electrically-HOT equipment can fatally shock a person whose body becomes a conductor. DO NOT STAND, SIT, LIE, LEAN ON, OR TOUCH a wet surface when welding without suitable protection.

To protect against shock:

Keep body and clothing dry. Never work in damp area without adequate insulation against electrical shock. Stay on a dry duckboard, or rubber mat when dampness or sweat cannot be avoided. Sweat, sea water, or moisture between body and an electrically HOT part - or grounded metal - reduces the body surface electrical resistance, enabling dangerous and possibly lethal currents to flow through the body.

1. Grounding the Equipment

When installing, connect the frames of each unit such as welding power source, control, work table, and water circulator to the building ground. Conductors must be adequate to carry ground currents safely. Equipment made electrically HOT by stray currents may shock, possibly fatally. Do NOT GROUND to electrical conduit, or to a pipe carrying ANY gas or a flammable liquid such as oil or fuel.

Three-phase connection. Check phase requirement of equipment

before installing. If only three-phase power is available, connect single-phase equipment to only two wires of the three-phase line. Do NOT connect the equipment ground lead to the third (live) wire, or the equipment will become electrically HOT - a dangerous condition that can shock, possibly fatally.

Before welding, check ground for continuity. Be sure conductors are touching bare metal of equipment frames at connections.

If a line cord with a ground lead is provided with the equipment for connection to a switch box, connect the ground lead to the grounded switch box. If a three-prong plug is added for connection to a grounded mating receptacle, the ground lead must be connected to the ground prong only. If the line cord comes with a three-prong plug, connect to a grounded mating receptacle. **Never remove the ground prong from a plug, or use a plug with a broken ground prong.**

2. Connectors

Fully insulated lock-type connectors should be used to join welding cable lengths.

3. Cables

Frequently inspect cables for wear, cracks, and damage. **IMMEDIATELY REPLACE** those with excessively worn or damaged insulation to avoid possibly lethal shock from bared cable. Cables with damaged areas may be taped to give resistance equivalent to original cable.

Keep cable dry, free of oil and grease, and protected from hot metal and sparks.

4. Terminals and Other Exposed Parts

Terminals and other exposed parts of electrical units should have insulating covers secured before operation.

5. Electrode Wire

Electrode wire becomes electrically HOT when the power switch of gas metal-arc welding equipment is ON and welding gun trigger is pressed. Keep hands and body clear of wire and other HOT parts.

6. Safety Devices

Safety devices such as interlocks and circuit breakers should not be disconnected or shunted out.

Before installation, inspection, or service of equipment, shut OFF all power, and remove line fuses (or lock or red-tag switches) to prevent accidental turning ON of power. Disconnect all cables from welding power source, and pull all 115 volts line-cord plugs.

Do not open power circuit or change polarity while welding. If, in an emergency, it must be disconnected, guard against shock burns or flash from switch arcing.

Leaving equipment unattended. Always shut OFF, and disconnect all power to equipment.

Power disconnect switch must be available near the welding power source.

INTRODUCTION

This manual details the installation and operation of your Prince™Torch, and Prince™Spool Gun.

These torches have 7 pin “W” clocked amphenol connectors and are designed for use with Cobramatic cabinets 150-003, 150-004, 150-103 and 150-104. To use these torches on existing 150-001, 150-002, 150-101, 150-102 , 150-201 and 150-202 (MK3A, MK3A PS) cabinets, a 7 pin “W” clocked adaptor, P/N 005-0162, must be used.

A WC-1 Weld Control Box, P/N 001-1055, is also offered for the Prince Spool Gun and includes constant current Posa Start® as a standard feature.

The Prince and Prince Spool Gun are identical except for the lead assemblies and spool portion.

The torch resembles our highly proven KING COBRA® torch and, in many ways, is a scaled down version. The Prince torch uses our standard Cobra gooseneck tips and cups and many other already stocked spare parts. Ease of maintenance was a major consideration in designing this torch.

The Prince comes standard with a straight barrel, but can also be used with an optional curved barrel available as a spare part (p/n 001-1056). The cup end of the barrel has an adapter that is easily replaced if the cup threads become damaged.

The wire speed control knob is located on the bottom of the torch handle and provides 3 3/4 turns of rotation, with a maximum speed of 750 ipm.

An important feature of the Prince torch is that it can be easily converted to a 1 lb spool gun by simply adding a rear spool adapter kit (p/n 005-0161) and removing the wire conduit. You may also provide the electrical requirements by using our WC-1 weld control box (p/n 001-1055) rather than the Cobramatic Cabinet, when using the Prince in spool applications.

SPECIFICATIONS

PRINCE

Wire Capacity

.030-.045 solid and hard wire
.030 - 1/16 aluminum and cored wire

Wire Speed

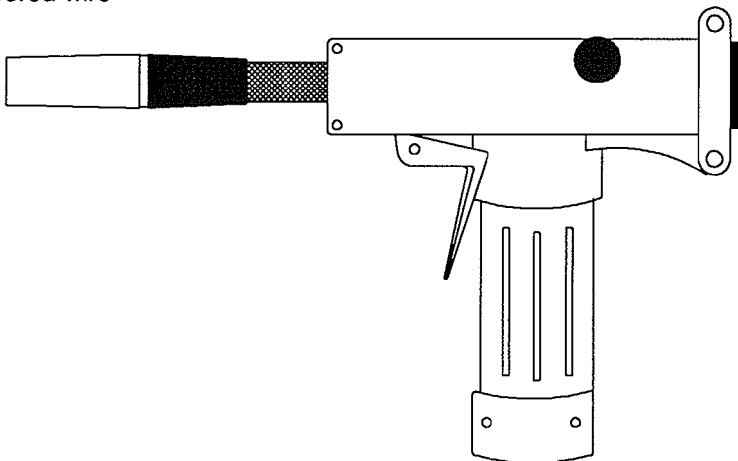
750 ipm max.

Duty Cycle

100% at 200 amps
with argon gas

Torch weight (less leads)

32 oz.



SPOOL GUN

Wire Capacity

.030-.045 solid and hard wire
.030 - 1/16 aluminum and cored wire

Wire Speed

750 ipm max.

Spool Size

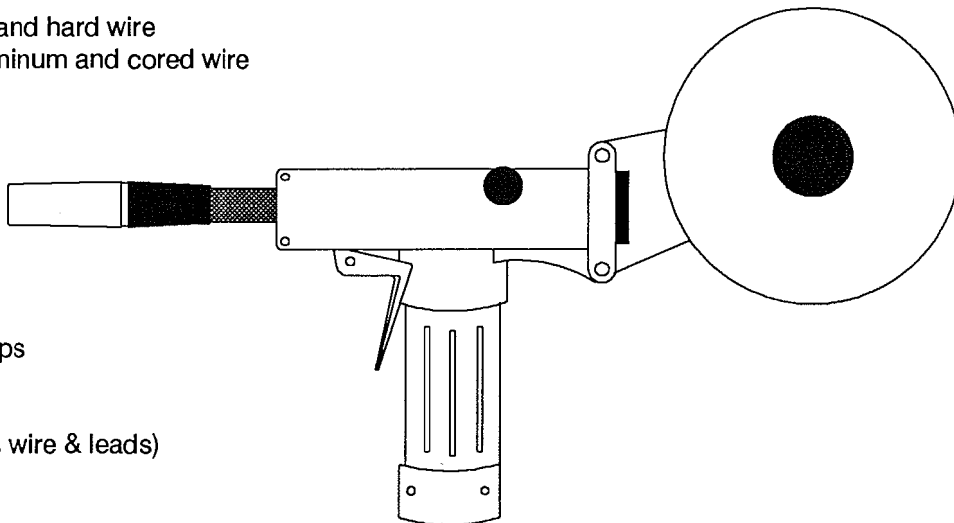
4 inches

Duty Cycle

100% at 200 amps
with argon gas

Torch weight (less wire & leads)

40 oz.



CONTACT TIPS

Wire Size	Tip I.D.	Arc Use	Length	Part Number
.030in./ .8mm	.036in./ .9mm	Spray	1-1/2in./ 38.0mm	621-0325
		Short	1-3/4in./ 44.5mm	621-0326
.030in./ .8mm	.040in./ 1.0mm	Spray	1-1/2in./ 38.0mm	621-0076
.035in./ 0.9mm		Short	1-3/4in./ 44.5mm	621-0077
.035in./ 0.9mm	.044in./ 1.1mm	Spray	1-1/2in./ 38.0mm	621-0001
		Short	1-3/4in./ 44.5mm	621-0002
.045in./ 1.2mm	.053in./ 1.35mm	Spray	1-1/2in./ 38.0mm	621-0327
* .045in./ 1.2mm	.060in./ 1.5mm	Spray	1-1/2in./ 38.0mm	621-0003
.052in./ 1.3mm		Short	1-3/4in./ 44.5mm	621-0286
1/16in. 1.6mm	.075in./ 1.9mm	Spray	1-1/2in./ 38.0mm	621-0075
1/16in. 1.6mm	.085in./ 2.16mm	Spray	1-1/2in./ 38.0mm	621-0153
		Short	1-3/4in./ 44.5mm	621-0154

* STANDARD - FURNISHED WITH TORCH

All Contact Tips Stamped with Tip I.D.

NOTE: As a rule of thumb, use the smaller I.D. tip for steel, stainless steel, and the 5000 series aluminum. Softer alloys such as the 1000 and 4000 series aluminum require more clearance and, therefore, use a larger I.D. tip.

GAS CUPS

Standard Gas Cups			Heavy-Duty Gas Cups		
Size	I.D.	Part No.	Size	I.D.	Part No.
5	1/4in./6.3mm	621-0079	8	1/2in./12.7mm	621-0366
6	3/8in./9.5mm	001-0137	10	5/8in./15.8mm	621-0367
* 8	1/2in./12.7mm	001-0138			
10	5/8in./15.8mm	001-0139			

* STANDARD - FURNISHED WITH TORCH

TORCH LINERS

Barrel	Liner Material	Wire Type Used	Part Number
* Straight	Green Teflon	All	615-0316
Curved	Green Teflon	Aluminum	615-0317
Curved	Steel Spiral	Steel/Cored	615-0318
1 lb. Spool Liner (liner only)	Black Teflon	All	615-0185

* STANDARD - FURNISHED WITH TORCH

OPTIONAL KITS

Insulated Knurled Drive Roll Kit **005-0118**

For .030 through 1/16" dia. wire. Includes an insulated drive roll p/n 511-0068 and idler roll p/n 511-0074.

.030-.035 Insulated Groove Drive Roll Kit **005-0334**

For .030-.035 in/.8-.9 mm dia. aluminum wire. Includes idler roll assy. P/N 511-0072 and drive roll assy. P/N 511-0069.

.045 Insulated Grooved Drive Roll Kit **005-0335**

For .045/1.2 mm dia. aluminum wire. Includes idler roll assy. P/N 511-0072 and drive roll assy. P/N 511-0070.

NOTE : Insulated drive roll kits are used to prevent preheating of the wire which may soften it and clog the liner. This picking up of current at the drive rolls rather than at the contact tip is usually not a problem unless using too large of a contact tip or excessively oxidized aluminum wire.

1 lb. Adaptor Kit **005-0161**

Used to change a standard 145-XXX series Prince torch into a 1 lb. Spool Gun.

7 Pin "W" Clocked Adaptor Kit **005-0162**

Used to update a 150-001, 002, 150-101, 102 and 150-201,202 Cobramatic cabinets to allow the use of the Prince and other "W" clocked torches.

OPTIONAL ACCESSORIES

Flat Spiral Steel Conduit	15 ft./4.5m	615-0031 *
for steel and cored wire	25 ft./7.6m	615-0032 *
	50 ft./15.0m	615-0073 *

* Must cut off heat shrink, slide back nut, and remove two E rings.

Curved Barrel **001-1056**

MAINTENANCE TOOLS

Tool	Part Number
Gas Valve Removal Tool	931-0584
Conduit Coupler Fitting	757-0012

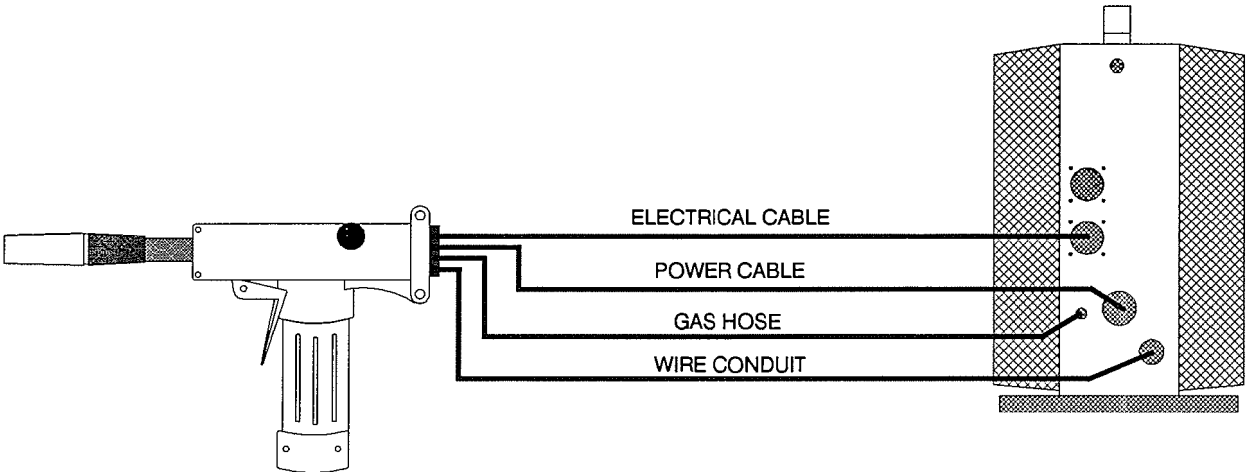
INTERCONNECTIONS

Cobramatic Cabinet
(With 'W' Clocked Adapter p/n 005-0162)

Model #150-001, 150-002
150-101, 150-102 (MK3A, MK3APS)
150-201, 150-202

Prince Torch

Model Prefix # 145



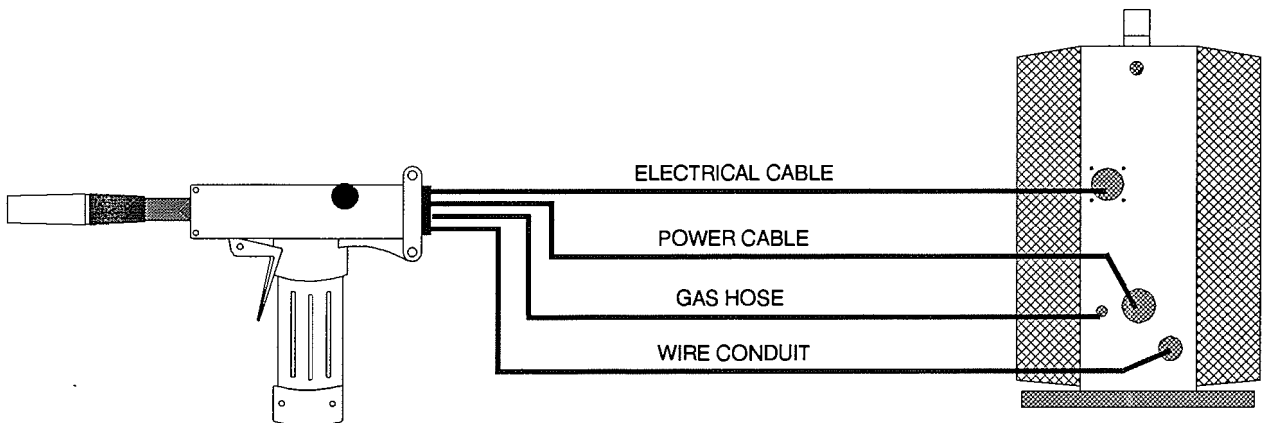
INTERCONNECTIONS

Cobramatic I,II Cabinet
(with 'W' clocked connector)

Model #150-003, 150-004
150-103, 150-104

Prince Torch

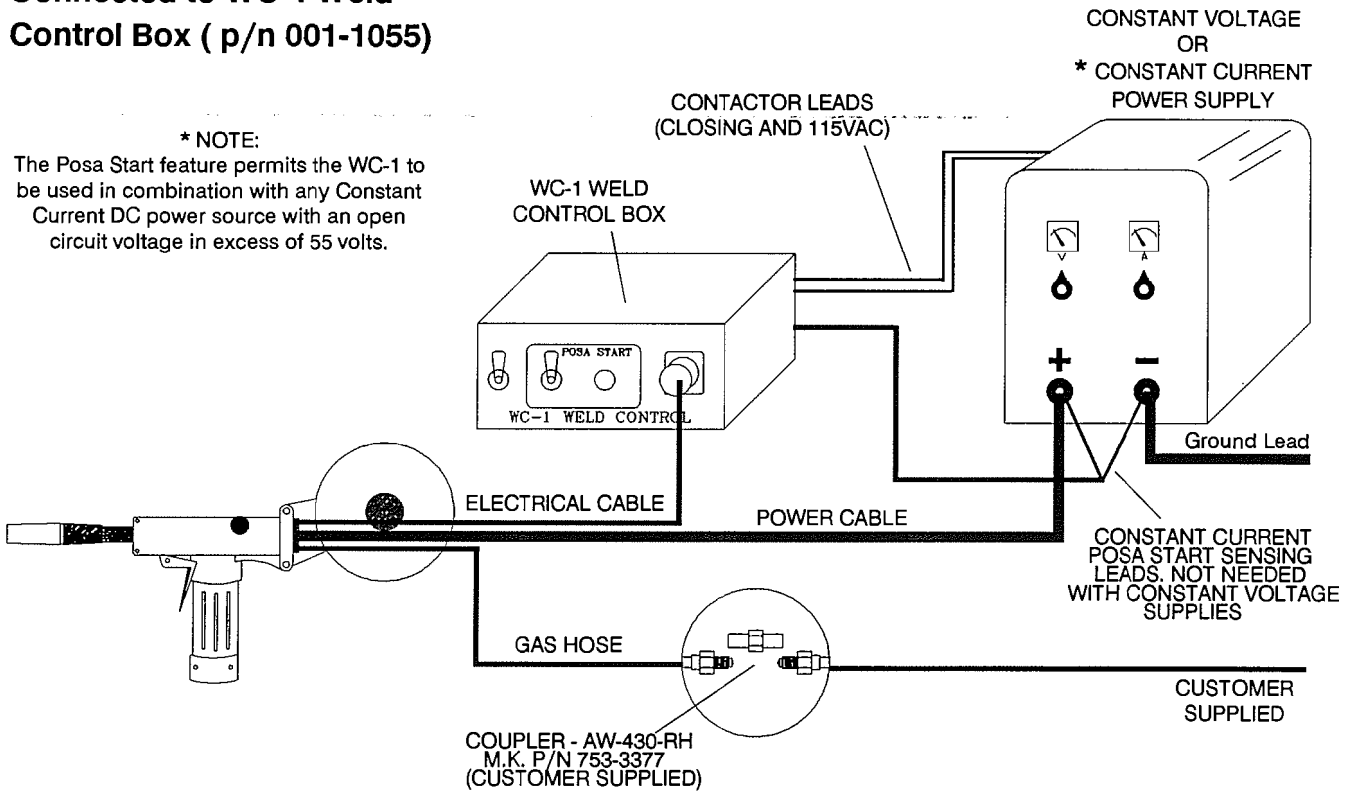
Model Prefix #145



INTERCONNECTIONS

**Prince Spool Gun
Connected to WC-1 Weld
Control Box (p/n 001-1055)**

Model Prefix # 146-xxx

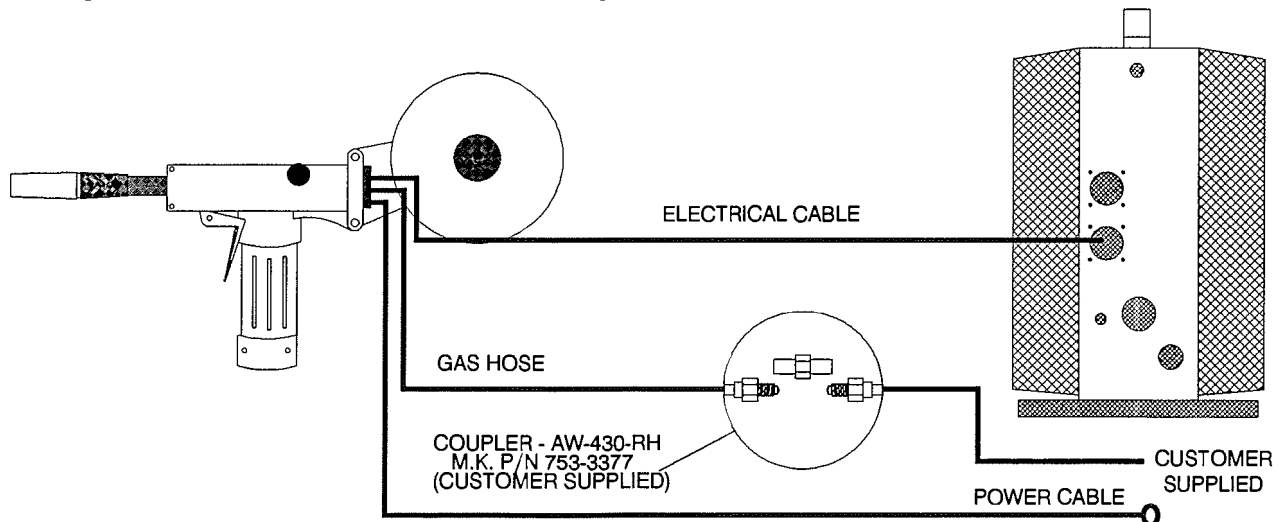


**Cobramatic Cabinet
(with 'W' clocked adapter p/n 005-0162)**

**Model #150-001, 150-002
150-101, 150-102**

**Prince Spool Gun
Using Cobramatic Cabinet to control Spool Gun**

Model Prefix #146-xxx



OPERATION

1. GENERAL

The Prince torch was specifically designed to operate as both a push-pull gun and a one pound spool gun. The 24 volt DC torch motor is controlled by a 3 3/4 turn potentiometer recessed in the pistol grip. The torch trigger is so designed that when it is partially depressed, gas flow starts via the valve located in the torch body - prior to ignition of the arc. When the trigger is partially released after welding (extinguishing the arc), gas flow continues until the trigger is fully released. Built-in pre and post gas flow. Consumable parts, i.e., gas cups, tips, drive and idler rolls, are the same as those used in the Cobra gooseneck. The modular design allows parts to be replaced in sub assemblies for minimum spare parts inventory and less down time.

2. BARRELS

The Prince comes standard with a straight barrel. An optional curved barrel is also available as a spare part. The cup end of the barrel has an adapter that is easily replaced if the cup threads become damaged. The adapter is threaded on the barrel and secured with 2 set screws. When installing or removing the adapter, ensure that the set screws are backed out at least 1/16" above adaptor insulator to prevent damaging barrel threads. Access holes located on the top of the torch allow the barrel to be removed or rotated easily without removing the handles.

WARNING: Do not attempt to weld without the barrel being tightly secured in the torch body, or damage to the barrel or body may result.

3. POTENTIOMETER

The pot is located in the bottom of the pistol grip and provides 3-3/4 turns of rotation and up to 750 ipm.

The pot is mounted to one side of the PC board and held in place by the support plate, both of which have slots that locate and secure the pot in the handles. The other side of the PC board houses the motor connectors and ribbon cable. Locking disks behind the pot knob provides a stop at the minimum and maximum pot settings.

4. MICRO SWITCH

The micro switch assembly consists of the micro switch, leads, and connector. The assembly is secured to the torch block with two(2) screws. An insulator between the torch block and micro switch prevents accidental shorting of the switch leads. The leads are laid in the channel under the motor and held in place with electrical tape.

5. LEAD ASSEMBLIES

POWER CABLE

A #2 AWG power cable is used on the Prince Torch. The torch end is wrapped with a copper band and secured in the torch body with a set screw. A tie wrap is also used to help secure the power cable to the torch body. The power cable fitting connects to the slave motor assembly when using a Cobramatic wire feed cabinet. When the Prince is purchased as a 1lb. Spool Gun, the power cable comes standard with a lug connector.

CONDUIT

The Prince Torch comes standard with a teflon lined conduit. The longer fitting with a shallow groove is used on the torch end. A set screw located on top of the torch handle secures the conduit in place. A Cobramatic Gooseneck conduit may be used on the Prince Torch by simply removing the conduit nut. A small spool liner is used on the 1lb. spool gun and held in place by the same set screw.

GAS HOSE

The gas hose fitting is screwed into the torch block and sealed with teflon tape or pipe dope. Take care to prevent getting sealant in gas passages. To prevent twisting of the gas hose, it should be attached to the torch first when installing the lead assemblies. The cabinet end of the Prince uses our standard gas fitting(1/8-27 nps), whereas the 1lb. spool gun uses a 5/8 IAA RH male gas fitting.

ELECTRIC CABLE

A seven conductor control cable is used on the Prince Torch. The torch end of the control cable is secured to the power cable with a tie wrap and plugged into the pot assembly and micro switch connectors. The cabinet end has a seven pin "W" clocked amphenol connector. See page 28 for torch electrical connections.

6. DRIVE AND IDLER ROLLS

A. GENERAL

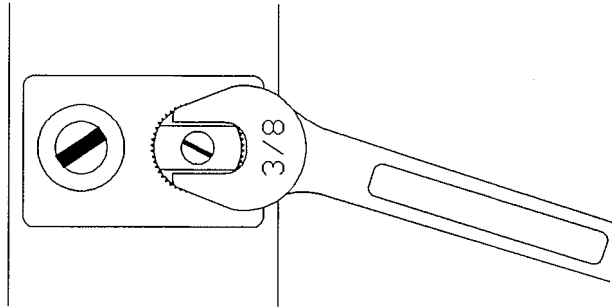
The Prince torch comes standard with knurled drive rolls which will handle wire diameters from .030-1/16 inch. Optional V-groove drive rolls are also available for feeding aluminum wire if desired (see page 9).

Drive roll tension is accomplished by means of a pressure- adjusting knob located on the left hand side of the torch. Proper tension is achieved when wire does not slip if a small amount of pressure is added to the wire as it exits the tip.

NOTE: Over-tightening of the drive rolls will cause excessive knurling and/or deformation of the wire.

B. DRIVE ROLL INSTALLATION/REMOVAL

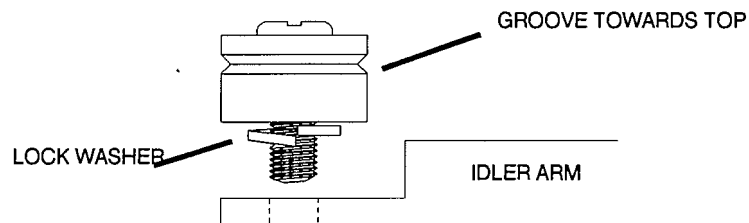
1. Rotate drive roll by jogging drive motor with trigger switch or with finger tips until slots line up with door.
2. Hold the drive roll with 3/8" open-end wrench.



3. Insert a slot type screwdriver into the slot on motor shaft, and turn screwdriver CCW (left hand thread).
4. Install new drive roll on motor shaft using left hand thread. Drive roll will self-tighten when feeding wire.

C. IDLER ROLL INSTALLATION/REMOVAL

1. Using a slot type screwdriver, loosen idler screw, taking care not to lose lock washer under idler roll.
2. Insert new idler roll and lock washer onto screw, insuring that idler groove is toward top and lock washer is beneath.

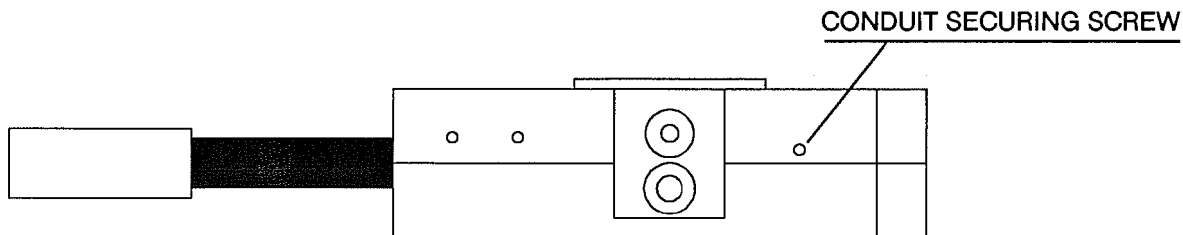


3. Tighten.

INSTALLING SPOOL ADAPTOR

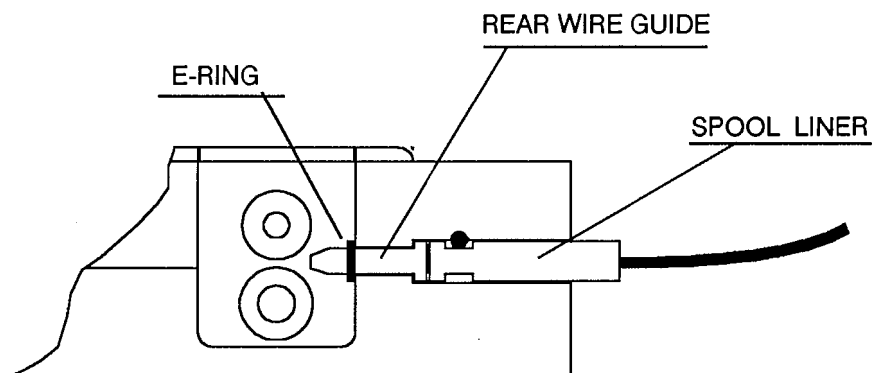
(Kit P/N 005-0161)

1. Loosen the screw that secures the conduit through access hole located on top right rear handle with a 1/16" Allen wrench.

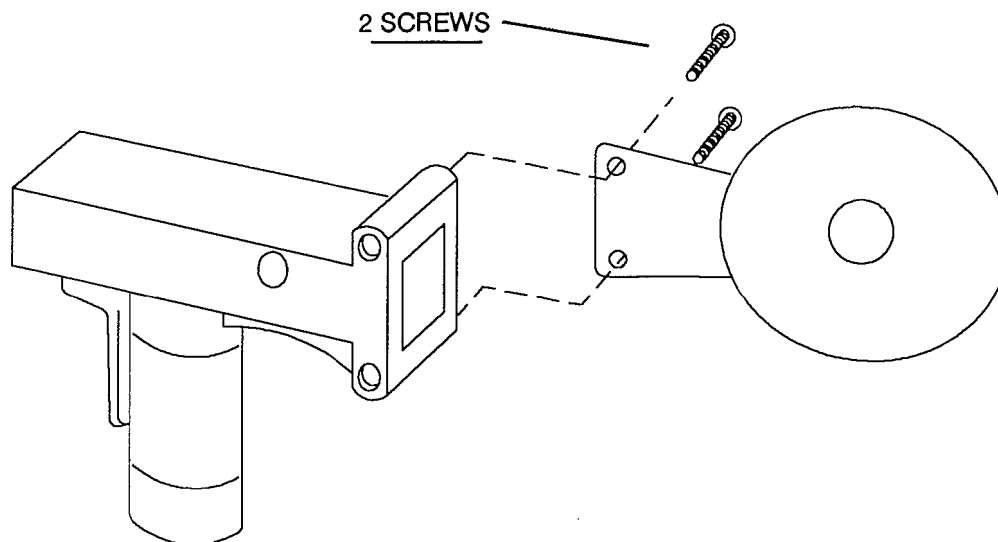


2. Remove conduit, taking care not to lose rear wire guide, which is held in place by conduit, and E-Ring.

3. Install spool liner, and secure with screw.



4. Remove both rear handle screws, and secure spool with longer screws provided.



SPOOL GUN

Loading Electrode Wire

1. Unscrew, and remove spool cover.
2. Apply tension to drive rolls, so wire will be picked up and fed through contact tip.
3. Place spool on shaft with wire coming off bottom of spool. Straighten out first six inches of wire, and push wire end into liner. Do not release spool.
4. Jog trigger until wire is picked up by drive rolls and fed through contact tip.
5. Grasp gun with left hand, and place thumb against bottom edge of spool, to keep wire from back-spinning.
6. Put spool cover on, making sure slot is over liner and surrounding thumb.
7. Tighten cover knob down until correct drag is achieved. (Tightening down cover knob increases drag on wire spool.)

NOTE: When feeding steel and other hard wires, a stiffer spring is used to apply more brake tension. See breakdown on page 25.

Disassembly Prince/Spool Gun

1. Remove trigger pin with punch and remove trigger.
2. Unscrew drive roll tension adjusting screw from idler arm, and set aside, taking care not to lose spring.
3. Remove six(6) handle screws and spool adapter if installed.
4. Pull handles apart.

MAINTENANCE

Maintenance of the torch will normally consist of a general cleaning of the wire guide system, including tubes, drive rolls, and conduit at regular intervals. The only parts on the Prince torch/Spool Gun that are subject to normal wear are the conduit, contact tips, gas cups, and barrel liners. A supply of those parts should be maintained on hand.

WC-1 OPERATION

General

The WC-1 is designed to interface the 1 lb. spool gun to most DC constant current, constant voltage, and pulsed power supplies. Constant current Posa Start, offered as standard equipment, allows you to select a run-in wire speed that is different than the wire speed when welding.

The unit consists of a solid state DC speed control module, Posa Start module, and step down transformer, which operates off of 115 VAC 50/60 Hz power and provides both closing contacts and 115 VAC contactor signals.

INSTALLATION

(See interconnections page 11)

A. Location

The WC-1 should be secured to the power supply or another suitable location where it can be secured to protect it from damage. Lead lengths and accessibility to a 115 VAC 50/60 Hz power source must also be considered when installing the control. Refer to page 26 for dimensional information.

B. Contactor Selection

The WC-1 is shipped from the factory in the closing contacts position. A six foot contactor/Posa Start sense cable is supplied with the unit to which the black and white wires supply the contactor signal.

NOTE: Refer to the power supply owner's manual for location of and type of contactor signal required.

WARNING: Disconnect the WC-1 from all power sources before changing contactor.

If a 115 VAC signal is required, remove the four screws from both sides of control box, and remove cover. Locate black and white wire on #6 and #7 of terminal strip J2. Move black wire to #5 and white wire to #4, and replace cover. The unit will now supply 115 VAC on the black (hot) and white (neutral) wires.

WARNING: In the 115VAC Contactor Mode, the contactor leads will be "LIVE" with 115VAC whenever the the trigger is pulled. Leads should be protected to prevent accidental contact and labled 115VAC.

C. Posa Start Connections

When using a constant current power supply, the Posa Start sensing leads must be connected to the power source. Place the red wire on the power supply positive terminal and the green wire on the power supply negative terminal. When using a constant voltage power supply, the sensing leads need not be connected, and the Posa Start should be turned off.

D. Spool Gun Connections

1. Connect the gun control cable amphenol plug to the WC-1, and secure.
2. Attach the power cable lug from the gun to the positive terminal of the power supply, and the negative terminal of the power supply to work ground.
3. Connect gas hose to regulator/flowmeter on gas supply.

E. 115 VAC Connections

Connect the supplied three-prong plug to a 115 VAC 50/60 Hz outlet.

CONSTANT VOLTAGE OPERATION

INTRODUCTION

When using the WC-1 in conjunction with a constant voltage power supply, the Posa Start should be turned "Off".

Instructions

1. Attach WC-1 and spool gun to CV power source according to the installation instructions, page 11.
2. Turn the WC-1 to the "On" position and the Posa Start to the "Off" position.
3. Adjust power source to desired voltage for your weld condition.
4. Depress gun trigger, and adjust wire feed speed at gun to match voltage setting. If approximate wire feed speed is not known, it is better to start with excess wire feed rather than too little, in order to prevent a burn-back.
5. Strike an arc, and adjust wire feed rate until correct condition is achieved.

CONSTANT CURRENT OPERATION

Introduction

The WC-1 is equipped with Posa Start, which permits the spool gun to be used in combination with any constant current DC welding power source with an open circuit voltage in excess of 55 volts. Also, reverse polarity must be used.

CAUTION: **DO NOT** connect the WC-1 to a power source equipped with high frequency (HF) before making sure that the HF portion of the welder is turned off. Failure to take this precaution will damage the Posa Start module, even if the WC-1 is turned off.

The Posa Start feature provides a slow run-in speed which is necessary for establishing an arc with a constant current power source. Once the arc has been established, the wire feed speed is automatically changed from the slow run-in speed to the welding speed set on the gun potentiometer.

Instructions

1. Attach WC-1 and spool gun to CC power source according to the installation instructions on page 11.
2. Insure power supply high frequency switch is in the "Off" position, and power supply is set to DC reverse polarity.
3. Turn the WC-1 power switch to the "On" position and the Posa Start switch to the "Off" position.
4. Adjust power source to desired amperage for your weld condition.
5. Depress gun trigger, and adjust wire feed speed at gun to match current setting. If approximate wire feed speed is not known, it is better to start with excess wire feed rather than too little, in order to prevent possible damage to the contact tip.
6. Turn Posa Start switch to the "On" position. Depress torch trigger and, using Posa Start control on WC-1, adjust wire feed speed to approximately 40 ipm (4" of wire in 6 seconds).
7. Strike an arc if the wire stubs out, reduce wire feed rate at gun, or increase amperage setting on power source.

NOTE: Because the Posa Start run-in speed always remains a percentage of the actual welding wire feed rate, the Posa Start run-in speed will always slow down or speed up, proportional to any adjustment you now make at the gun. Therefore, if you slow down the welding wire feed speed, you will have to increase the Posa Start setting.

TROUBLESHOOTING

Maintenance

Regardless of which torch or feeder used, all M. K. Products push-pull guns operate on the same principle. The 115 VAC slave motor in the feeder runs at a fast, constant speed, but has very low torque. It is always trying to feed more wire than the torch motor wants, and when the motor gets all it wants, it slows the slave motor, preventing a bird's nest. Because of the low torque produced by the slave motor, a brake system is used to prevent wire overrun rather than tension. The drag adjustment in the spindle is used simply to keep the wire slightly taut, so it will not pull off the spool while feeding wire.

The 24 VDC torch motor is controlled by a solid state speed control and a pot located in the torch. The torch motor, potentiometer, and micro switch are connected to the cabinet/control box via a control cable and amphenol. If this cable becomes damaged, a variety of symptoms can occur, depending on which wire(s) break. To test, check each wire for continuity and shorts.

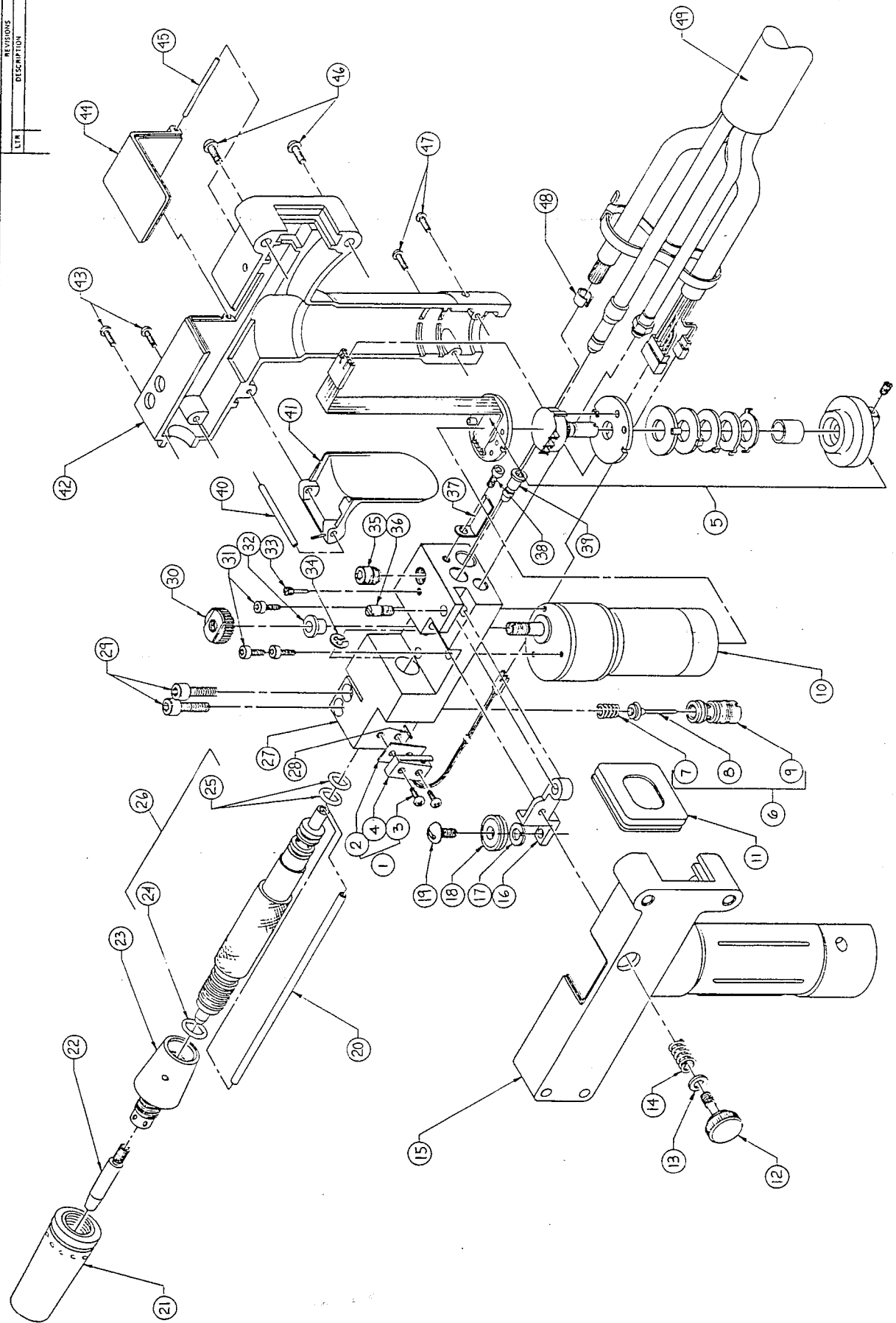
Remember the micro switch in the torch activates both the 115 VAC and 24 V circuits in the cabinet. Therefore, if the slave motor and brake solenoid operate, but the torch does not, look more toward the 24 V circuits, speed control, control cable, or the torch motor. If nothing operates, look more toward the 115 VAC input, micro switch leads, or micro switch.

The complete pot assembly is connected to the motor and set into the handles. If the pot is disassembled, the pot knob can be put on the shaft in any position and secured with the set screw. Turn the knob fully CCW, then fully CW. This will self-align the pot, i.e., fully CCW will be minimum wire feed speed, and fully CW will be maximum wire speed.

TROUBLESHOOTING

TROUBLE	CAUSE	REMEDY
No wire feed at torch, feeder not operating, i.e., no slave motor or brake solenoid.	5 amp fuse in feeder/ control box blown. Micro-switch defective/ not being activated. Broken electrical cable.	Replace fuse. Replace switch/ Check switch for operation. Check micro switch wires for continuity.
No wire feed at torch, feeder operating properly.	2 amp fuse in feeder/ Control box blown. Bad Potentiometer. Broken electrical cable. Bad speed control/PCB.	Check motor leads for shorts; then replace fuse. Check potentiometer with meter. Check motor and potentiometer wires for continuity. See specific cabinet/control box owners manual for speed control operation.
Wire feeds, but welding wire is not energized.	Loose or no cable connections. Contactor control cable loose or in wrong position. Welding power source.	Check all power connections. Check power supply owners manual for location and type of contactor signal required, i.e., closing contacts or 115 VAC. Check power source for operation.
Wire feeds erratically.	Excessive spool drag pressure. Dirty or worn conduit. Incorrect pressure on drive rolls. Idler roll stuck. Wrong size contact tip.	Decrease spool drag pressure. Blow out or replace conduit. Adjust pressure at both feeder and torch. Check for lock washer under idler roll, or replace if damaged. See contact tip section.
Wire feeds one speed only.	Bad potentiometer. Broken electrical cable. Bad speed control.	Check with meter. Check potentiometer wires for continuity or short. See specific cabinet/control box owners manual for speed control operation.
Wire walks out of drive rolls.	Idler roll upside-down. Rear wire guide missing.	Place groove in idler roll toward top, see page 14 . Replace wire guide, see breakdown, page 23, item 39.

REV	DESCRIPTION	BY	APPROV	DATE



ITEM	MATERIAL PART NO	QTY	DESCRIPTION

ALL DIMENSIONS ARE IN INCHES
 UNLESS OTHERWISE SPECIFIED
 DIMENSIONS ARE TO BE HIDDEN WITHIN 0.015 IN
 UNLESS OTHERWISE SPECIFIED
 FINISH FOR ALL MACH PART FINISH ✓

MK
 MK PRODUCTS, INC
 1001-1070

PRINCE - TORCH
 ASSEMBLY

SPECIFICATION & DESCRIPTION

NEXT ASSY USED ON

PRINCE TORCH

Parts List

<u>NO.</u>	<u>P/N</u>	<u>QTY.</u>	<u>DESCRIPTION</u>
1	003-0568	1	Micro-Switch Assy.
2	261-0069	1	Insulator Micro-Switch
3	325-0025	2	Screw 2-56 UNC-3/8
4	161-0002	1	Micro-Switch w/o Leads
5	003-0567	1	Potentiometer Assy.
6	001-0562	1	Gas Valve Assy.
7	419-0742	1	Spring .250 ODX.025 Wire
* 8	431-0740	1	Valve Stem
9	431-0515	1	Valve Body
10	211-0054	1	Gear Motor 32.1 to 1
11	301-0050	1	Boot Rubber
12	003-0587	1	Adjusting Screw Assy.
13	331-0036	1	Washer Flat .310 ID
14	419-0020	1	Spring .290 ODX.047 wire
15	436-0019	1	Handle Left Side
16	431-2010	1	Idler Arm
17	333-0082	1	Washer Lock #10
18	511-0001	1	Idler Roll
19	325-0206	1	Screw PH #10-24-3/8
20	615-0316	1	Liner Teflon-Prince
21	See Page 8	1	Gas Cup
22	See Page 8	1	Contact Tip Cobra
23	003-0566	1	Cup Adapter Assy.(including)
	321-0001	2	Screw CPS 4-40 x 1/8
24	303-0093	1	O-Ring-.364 ID X .070
25	303-0094	2	O-Ring-.301 ID X .070
26	001-1075	1	Barrel Assy. - Straight (standard)
26	001-1056	1	Barrel Assy. - Curved
27	003-1246	1	Body-Prince Torch
28	421-0129	1	Spring Pin 1/16 Dia X 7/16
29	328-0048	2	Screw SHC 10-32 UNF-3/4
30	511-0016	1	Drive Roll Cobra
31	328-0003	3	Screw SHC 4-40-1/2
32	315-0268	1	Bushing Flanged
33	321-1074	1	Screw 6-32-.50 Modified
34	313-0008	1	E-Ring 3/16 ID.
35	321-0108	1	Screw CPS 5/16-18-1/2
36	431-0162	1	Pivot Pin Idler Arm
37	431-2014	1	Bracket Power Cable
38	328-0001	1	Screw SHC. 4-40-1/4
39	431-2013	1	Wire Guide Prince
40	421-0409	1	Pin Pivot Trigger
41	003-0585	1	Trigger Assy.
42	436-0018	1	Handle Right Side
43	325-0079	2	Screw PH.4-40-1-1/2
44	431-3061	1	Door
45	421-0408	1	Pin Pivot Door
46	325-0143	2	Screw PH.6-32-1-1/2
47	325-0071	2	Screw PH.4-40-1/2
48	435-0900	1	Wrap Copper Power Cable
49	See Page 24	1	Lead Cable Assy.
50	411-0020	2	Tie Wrap

* NOTE: If feeder is equipped with gas solenoid, modified gas valve stem P/N 431-1080 must be installed.

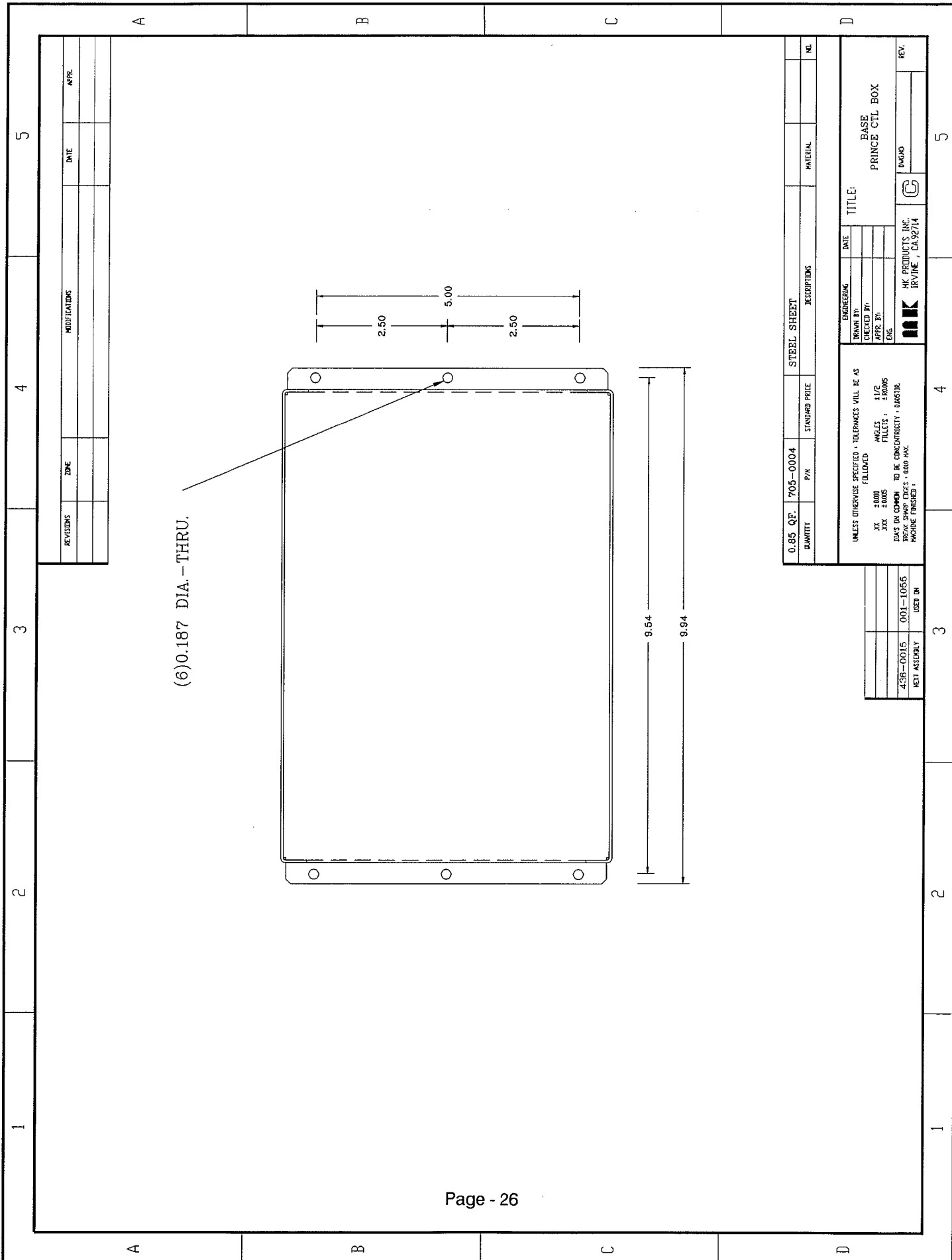
**PRINCE TORCH & SPOOL GUN
LEAD ASSEMBLY BREAKDOWN**

PRINCE TORCH

Cable Assy.	Conduit	Power Cable	Elect. Cable 7 Pin "W" Clock	Gas Hose	Cable Cover
15'Prince 001-3005	615-0007	843-0320	001-1077	522-0185	551-0274
25'Prince 001-3006	615-0008	843-0321	001-1078	522-0186	551-0275

1 LB. SPOOL GUN

Cable Assy.	Spool Liner Assembly	Power Cable	Elect. Cable 7 Pin "W" Clock	Gas Hose	Cable Cover
15'Spool Gun 001-3007	003-0198	003-1295	001-1077	522-0175	551-0274
25'Spool Gun 001-3008	003-0198	003-1296	001-1078	522-0176	551-0275
50'Spool Gun 001-3009	003-0198	003-1297	001-1081	522-0178	551-0277



(6)0.187 DIA. - THRU.

REVISIONS	ZONE	MODIFICATIONS	DATE	APPR.

QTY.	P/N	STANDARD PRICE	DESCRIPTIONS	MATERIAL	MT.
0.85	705-0004		STEEL SHEET		

ENGINEERING	DATE	TITLE
DRAWN BY:		BASE PRINCE CTL BOX
CHECKED BY:		
APPR BY:		
ENG.		

UNLESS OTHERWISE SPECIFIED - TOLERANCES WILL BE AS FOLLOWS:	
XX ±0.00	ANGLES 11/2
XXX ±0.005	FILLETS, 5 ROUNDS
DIAS ON COMMON TO BE CONCENTRICITY ±0.005 I.D.	
BREAK SHARP EDGES ±0.010 MAX.	
MACHINE FINISHED	

436-0015	001-1055	
NET ASSEMBLY	USED ON	

LIMITED WARRANTY

Effective February 15, 1995

This warranty supersedes all previous MK Products warranties and is exclusive, with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY - MK Products, Inc., Irvine, California warrants that all new and unused equipment furnished by MK Products is free from defect in workmanship and material as of the time and place of delivery by MK Products. No warranty is made by MK Products with respect to trade accessories or other items manufactured by others. Such trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any.

MK Products' warranty does not apply to components having normal useful life of less than one (1) year, such as relay points, wire conduit, tungsten, and welding torch parts that come in contact with the welding wire, including nozzles, nozzle insulators, and contact tips where failure does not result from defect in workmanship or material.

In the case of MK Products' breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be at MK Products' option: (1) repair; (2) replacement; (3) where authorized in writing by MK Products, the reasonable cost of repair or replacement at our Irvine, California plant; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Upon receipt of notice of apparent defect or failure, MK Products shall instruct the claimant on the warranty claim procedures to be followed.

As a matter of general policy only, MK Products may honor an original user's warranty claims on warranted equipment in the event of failure resulting from a defect within the following periods from the date of delivery of equipment to the original user:

1. **Torches and Weldheads** 1 year
2. **All Other Equipment** 2 years
3. **Mechanical & Electro-Mechanical Components** 1 year
4. **Electronic Assemblies and Sub-Assemblies** 2 years
5. **Repairs** 90 days

Classification of any item into the foregoing categories shall be at the sole desecration of MK Products. Notification of any failure must be made in writing within 30 days of such failure.

A copy of the invoice showing the date of sale, must accompany products returned for warranty repair or replacement.

All equipment returned to MK Products for service must be properly packaged to guard against damage from shipping, MK Products will not be responsible for any damages resulting from shipping.

Normal surface transportation charges (both ways) for products returned for warranty repair or replacement will be borne by MK Products, except for products sold for foreign markets.

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