



VIPER MC WELDING TORCH

Manual



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SCOPE OF THIS MANUAL

This Instruction Manual provides set-up, operating instructions and basic maintenance procedures for the Viper MC Plasma Welding Torches. Unqualified and / or untrained personnel are severely cautioned against attempting repairs or adjustments not covered in this Manual. Failure to heed these warnings may result in damage and possible personal injury.

A full understanding of the capabilities, functions and safety procedures associated with the equipment described herein should assure the safe and reliable operation for which it is designed. It is therefore essential that this Instruction Manual is read and understood thoroughly.

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Health and Safety Information

1. Before undertaking any maintenance and / or diagnostic procedures with the welding torches described herein it is essential to have read and fully understood the appropriate manuals supplied with the Plasma Welding system. Be especially aware of the warnings and precautions outlined therein and ensure that appropriate steps are taken to follow the safe practices recommended.
2. Never undertake maintenance on any plasma torch assembly unless the main disconnect is in the **OFF** position and securely tagged to prevent accidental connection of the supply during the maintenance process.
3. Do not reconnect the main disconnect unless all the welding torch consumables have been inspected to assure their condition and that the parts are correctly fitted as outlined in this manual.
4. Never attempt to start the pilot arc circuit of the machine unless the power source and weld controller are fully operational and in particular that the plasma gas flow rate, indicated on the flowmeter on the front panel of the power source or console indicates that the gas flow is set to the appropriate flowrate. **FAILURE TO COMPLY WITH THE ABOVE CONDITIONS MAY SERIOUSLY DAMAGE OR DESTROY THE TORCH AND / OR THE PILOT ARC POWER SUPPLY MODULE.**
5. Never attempt to start the pilot arc or undertake welding operations without the welding torch being securely fitted to its mounting bracket.

**READ
THESE
WARNINGS**

WARNINGS

**PROTECT
YOURSELF
AND OTHERS**

THE OPERATION AND MAINTENANCE OF ANY PLASMA ARC EQUIPMENT INVOLVES POTENTIAL HAZARDS.

PERSONNEL SHOULD BE ALERTED TO THE FOLLOWING HAZARDS AND PRECAUTIONS TAKEN TO PREVENT POSSIBLE INJURY.

SERIOUS INJURY OR DEATH may result if welding and cutting equipment is not properly installed, used and maintained. Misuse of this equipment and other unsafe practices can be hazardous. The operator, supervisor and helper must read and understand the following safety warnings and instructions before installing or using any welding or cutting equipment.

The welding /cutting process is used in many potentially dangerous environments such as elevated heights, areas of limited ventilation, close quarters, around water, in hostile environments etc., and it is important that the operators are aware of the dangers associated in working in these types of conditions. Be certain that the operator(s) are trained in safe practices for environments in which they are expected to work and under competent supervision.

It is essential that the operator, supervisor and others in the work place are aware of the dangers of the welding or cutting process. Training and proper supervision are important for a safe work place. Keep these instructions for future use. Additional recommended safety and operating information is referenced in each section.

ELECTRIC SHOCK CAN CAUSE INJURY AND DEATH.

Install and maintain equipment in accordance with the National Electric Code NFPA70 and local codes. Do not service or repair equipment with power on. Do not operate equipment with protective insulators or covers removed. Service or repair to equipment must be done by qualified and/or trained personnel only.

Do not contact electrically live parts. Do not touch electrode with bare skin and electrical ground at the same time. Always wear dry welding gloves in good condition. Aluminized protective clothing can become part of the electrical path. Keep oxygen cylinders, chains, wire ropes, cranes, hoists and elevators away from any part of the electrical path. All ground connections must be checked periodically to determine that they are mechanically strong and electrically adequate for the required current.

When engaged in alternating current welding/cutting under wet conditions or warm surroundings where perspiration is a factor, the use of reliable automatic controls for reducing no load voltage is recommended to reduce shock hazard. When the welding/cutting process requires values of open circuit voltages in alternating current machines higher than 80 volts and direct current machines higher than 100 volts, means must be provided to prevent the operator from making accidental contact with the high voltage by adequate insulation or other means.

When welding is to be suspended for any substantial period of time, such as during lunch or overnight, all electrodes should be removed from the electrode holder and the holder carefully located so that accidental contact cannot occur. The holder must be disconnected from the power source when not in use. Never immerse MIG-torches, electrode holders, TIG torches, Plasma torches or electrodes in water.

See safety and operating references 1,2 and 7.

SMOKE, GASES AND FUMES CAN BE DANGEROUS AND HAZARDOUS TO YOUR HEALTH.

Keep smoke, fumes and gases from the breathing area. Fumes from welding or cutting processes are of various types and strengths, depending on the kind of base metal being worked on. To ensure safety, do not breathe these fumes. Ventilation must be adequate to remove smoke, fumes and gases during the operation to protect operators and others in the area.

Vapours of chlorinated solvents can form the toxic gas "Phosgene" when exposed to ultraviolet radiation from an electric arc. All solvents, degreasers and potential sources of these vapours must be removed from the operating area.

Fumes produced by welding or cutting particularly in confined places can cause discomfort and physical harm if inhaled over an extended period of time. Provide adequate ventilation in the welding/cutting area. Use air-supplied respirators if ventilation is not adequate to remove all fumes and gases. Never ventilate with oxygen, because oxygen supports and vigorously accelerates fire.

See safety and operating references 1,2,3, and 4.

ARC RAYS, HOT SLAG AND SPARKS CAN INJURE EYES AND BURN SKIN.

The welding/cutting processes produce extreme localised heat and strong ultraviolet rays, never attempt to weld/cut without the proper lens that complies with federal guidelines. A number 11 to 14 shade filter provides the best protection against arc radiation. When in a confined area, prevent the reflective arc rays from entering around the helmet.

Make sure others are protected from arc rays and sparks. Approved shielding curtains and appropriate goggles should be used to provide protection to others in the surrounding work area and operators of nearby equipment.

Skin should always be protected from rays, heat and molten metal. Always wear protective gloves and clothing which will not allow skin to become exposed. All pockets should be closed and cuffs sewn shut. Leather aprons, sleeves, leggings etc should be worn for out of position welding/cutting or for heavy operations using large electrodes. High top work shoes provide adequate protection from foot burns. For added protection use leather spats. Flammable hair preparations should not be used when welding/cutting. Wear ear-plugs to protect ears from sparks. Where the work permits the operator should be enclosed in an individual booth painted with a finish of low reflectivity, such as zinc oxide, an important factor for absorbing ultraviolet radiation and lamp black or shall be enclosed with non-combustible screens similarly painted.

See safety and operating references 1,2 and 3.

WELDING SPARKS CAN CAUSE FIRES AND EXPLOSIONS.

Causes of fire and explosion are: combustible materials reached by the arc, flame, flying sparks, hot slag or heated materials. Remove combustible materials from the work area and/or provide a fire watch. Avoid oily or greasy clothing as a spark can ignite them. Have a fire extinguisher nearby and know how to use it.

Be alert to danger from heat conduction or radiation, for example: if welding/cutting is to be done on a wall, partition, ceiling or roof precautions must be taken to prevent ignition of combustible materials on the other side. Do not weld/cut containers that have held combustible substances. All hollow spaces, cavities and containers should be vented prior to welding/cutting to permit escape of air/gases. Purging with inert gas is recommended.

NEVER USE OXYGEN IN ANY ARC WELDING TORCH. Use only inert gas mixtures as required by the process. Use of a combustible compressed gases cause explosions resulting in personal injury or death. Arcing against any compressed gas cylinder can cause damage or explosion.

See safety and operating references 1,2,5,6 and 7.

SEE SAFETY AND OPERATING REFERENCES.

1. Code of Federal regulations (OSHA)

Section 29 part 1910.95, 132, 133, 134, 139, 251, 252, 253, 254, and 1000. U.S Government printing Office, Washington DC 20402.

2. ANSI Z49.1 "Safety in Welding & Cutting".

3. ANSI Z87.1 "Practice for Occupational and Educational Eye & Face Protection.

4. ANSI Z88.2 Standard Practice for Respiratory Protection.

5. AWS F4.1 "Recommended safe practices for Welding and Cutting Containers". The American Welding Society, 550 Lejeune Rd., P.O Box 351040, Miami PL 33135.

6. NFPA 51B "Fire prevention in Cutting and Welding Processes".

7 NFPA-7 "National Fire protection Association, Battery Park, Quincy MA 02269

8 CSA Standard W117.2 "Safety in Welding, Cutting and Allied Processes"

Canadian Standards Association, 178 Rexdale, Ontario, Canada M9W 1R1

1.0 – Technical Specifications

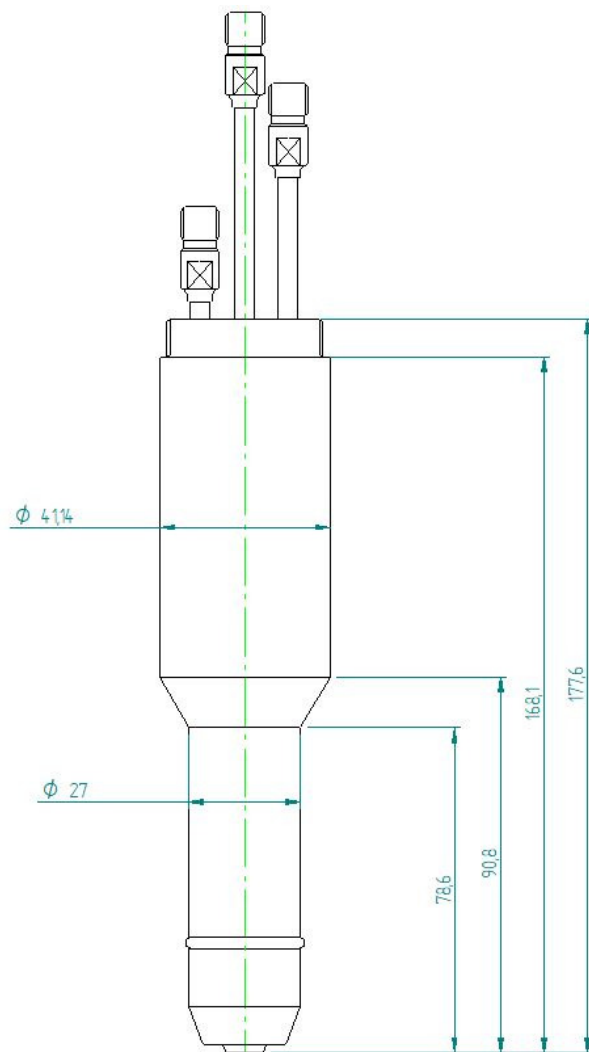
Welding Current Rating:

DC – 100% Duty Cycle	300 Amps
AC – 100% Duty Cycle	300 Amps

Coolant Requirements

NOTE – Any interruption of cooling water flow can irreparably damage the torch

Flow Rate	5 l/min
Maximum Coolant Temperature	45°C



2.0 – Maintenance Procedure for Viper MC Plasma Welding Torch

STEP 1

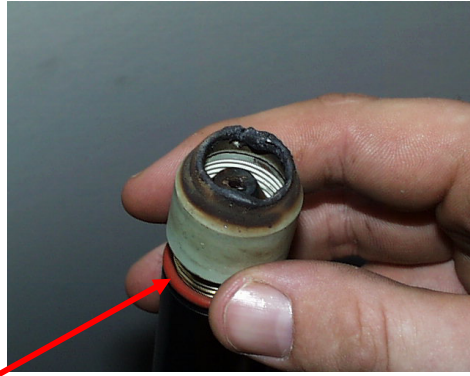


Set-up before maintenance.

Check parts for damage and for build up of spatter material within torch end. If replacement is needed follow onto step two.

Note in this case the shield cup is severely eroded and will need replacement.

STEP 2



Carefully remove shield cup – note O-Ring located at lower end of screw thread.

Check for damage – chips, cracks, melting and replace if these are evident. Check condition of 'O' ring and replace if necessary.

STEP 3



Using 15mm wrench loosen tip and unscrew by hand.

Check for damage – burning of material around orifice, build up of spatter material, ovalling or erosion of aperture. Replace if required.

STEP 4



The electrode can now be clearly seen and inspected for wear.

In this instance the point of the electrode is eroded. Excessive "bluing" of the electrode indicates possible plasma gas contamination or incorrect shut down procedure for the pilot arc.

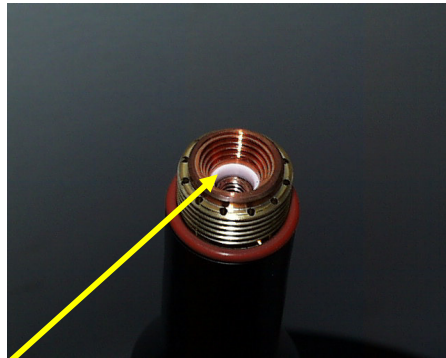
STEP 5



To remove the electrode slide electrode tool over the electrode by hand turning clockwise – use the end marked “OUT”.

Rotate counterclockwise to unscrew the electrode

STEP 6



The torch front end as stripped – the “o”-ring can be seen in place as can the white insulating insert. This insert should not be removed – it cannot be removed without damaging it, requiring replacement of the part.

USING TORCH WITHOUT INSERT OR WITH DAMAGED INSERT CAN CAUSE IRREPAIRABLE DAMAGE TO THE WELDING TORCH. INSPECT PART FOR CHIPS, CRACKS OR SIGNS OF EXCESSIVE SOOTING AND REPLACE AS NEEDED

STEP 7



Insert new electrode into the end of the electrode tool marked “IN”.

Firmly screw the electrode fully home using hand force only. Do not overtighten by using grips or a wrench as this can damage the torch head.

STEP 8

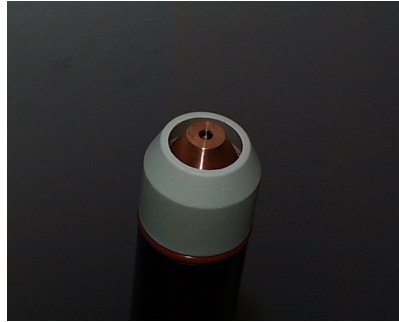


The new electrode is shown fitted into the torch. As can be seen the o-ring and insulating insert are fitted and the electrode is accurately centered with the torch body.

Ensure no debris is present on the screw threads of the torch.

STEP 9

Fit new tip into the end of the torch by hand until tight. Firmly nip the tip into place using a 15mm wrench – do not use excessive force as this can damage the torch.

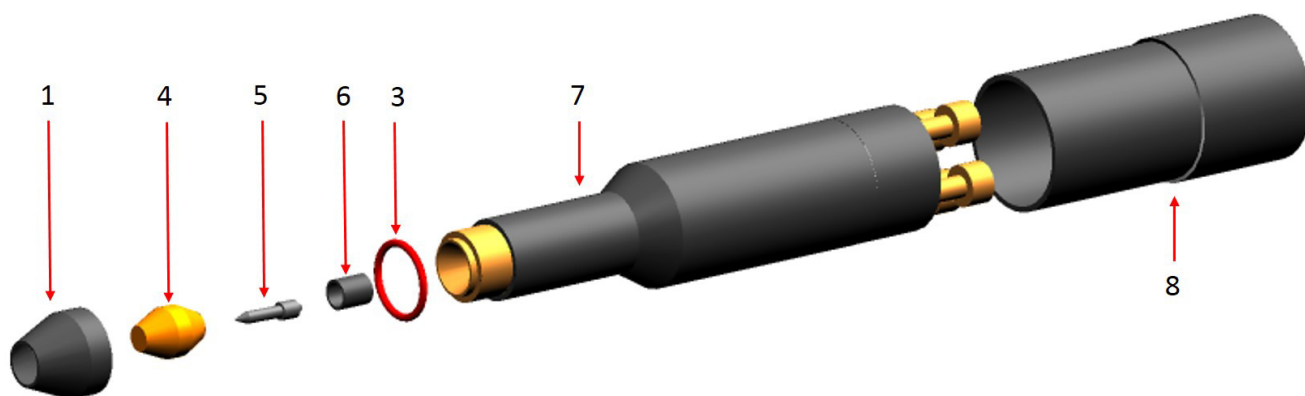
STEP 10

Fit new shield cup by screwing on firmly by hand only. Make sure that the shield cup seats properly against the o-ring to avoid shielding gas leaks.

If sintered bronze gas lens has separated from the shield cup refit this with chamfer towards torch to allow shield cup to locate properly.

IF COOLANT LEAKS ARE APPARENT THEIR SOURCE MUST BE DIAGNOSED AND CORRECTIVE MEASURES TAKEN BEFORE ATTEMPTING TO USE THE WELD TORCH ASSEMBLY. STARTING THE PILOT ARC OR WELDING PROCESS WITH ANY MOISTURE PRESENT MAY DESTROY THE WELD TORCH HEAD AND MAY CAUSE SERIOUS DAMAGE TO THE PLASMA ARC POWER SOURCE

Appendix 1 – Viper Series Torch – Machine Torch



Item	Part No	Description	Pack Size
1	061015-L	Shield Cup including Gas Diffuser	10
3	220001	O Ring (Shield Cup to Body)	5
4	021101-3.0C	Nozzle 3.0mm Special AM	5
5	022102-1.4C	Electrode 1.4mm SB DC Special	10
6	025009	Ceramic Insulator	5
7	070010	Viper Machine Torch Head Only	1
NS	T-991	Electrode Tool	1
NS	4-2525	Leadset – 12.5 ft	1
	4-2544	Leadset – 25 ft	1