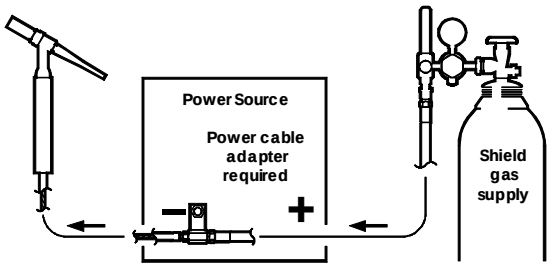
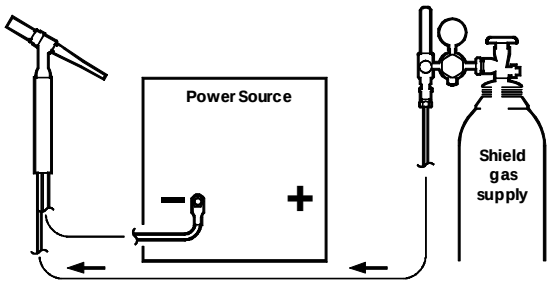
# TIG TORCH CONNECTIONS AND POLARITY CHARACTERISTICS

## CONNECTION DIAGRAMS FOR GAS COOLED TORCHES

**1 PIECE CABLE ASSEMBLY**




**2 PIECE CABLE ASSEMBLY**



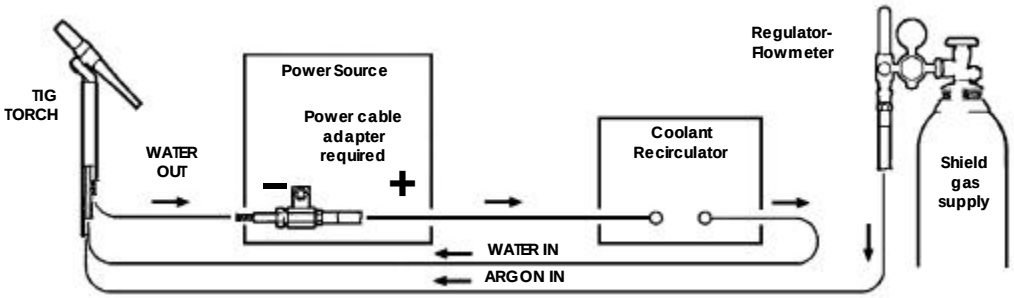

## CONNECTION DIAGRAM FOR WATER COOLED TORCHES

**NOTE:**

1 Quart (1 liter) per min. flow rate

Water in though water line

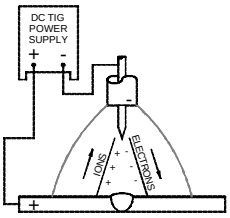
Water out though power cable




## CHARACTERISTICS OF CURRENT TYPES FOR GAS TUNGSTEN ARC WELDING

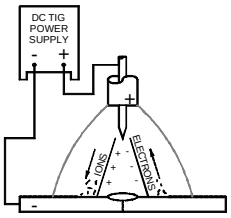
When TIG welding, there are three choices of welding current. They are: **D**irect **C**urrent **S**traight **P**olarity, **D**irect **C**urrent **R**everse **P**olarity, and **A**lternating **C**urrent with **H**igh **F**requency stabilization. Each of these has its applications, advantages, and disadvantages. A look at each type and its uses will help the operator select the best current type for the job. The type of current used will have a great effect on the penetration pattern as well as the bead configuration. The diagrams below, show arc characteristics of each current polarity type.

TIG welding with **DCSP** (direct current straight polarity) produces deep penetration because it concentrates the heat in the joint area. No cleaning action occurs with this polarity.



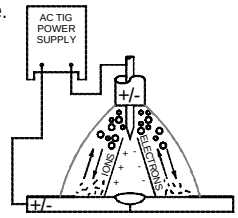

| CURRENT TYPE | DCSP |
|---|---|
| ELECTRODE POLARITY | Electrode Negative |
| OXIDE CLEANING ACTION | No |
| HEAT BALANCE IN THE ARC | 70% at work end<br>30% at electrode end |
| PENETRATION PROFILE | Deep, narrow |
| ELECTRODE CAPACITY | Excellent |

TIG welding with **DCRP** (direct current reverse polarity) produces good cleaning action as the argon ions flowing towards the work strike with sufficient force to break up oxides on the surface.




| CURRENT TYPE | DCRP |
|---|---|
| ELECTRODE POLARITY | Electrode positive |
| OXIDE CLEANING ACTION | Yes |
| HEAT BALANCE IN THE ARC | 30% at work end<br>70% at electrode end |
| PENETRATION PROFILE | Shallow, wide |
| ELECTRODE CAPACITY | Poor |

TIG welding with **ACHF** (alternating current high frequency) combines the good weld penetration on the negative half cycle with the desired cleaning action of the positive half cycle. High frequency reestablishes the arc which breaks each half cycle.




| CURRENT TYPE | ACHF |
|---|---|
| ELECTRODE POLARITY | Alternating |
| OXIDE CLEANING ACTION | Yes (once every half cycle) |
| HEAT BALANCE IN THE ARC | 50% at work end<br>50% at electrode end |
| PENETRATION PROFILE | Medium |
| ELECTRODE CAPACITY | Good |