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Technical Newsletter from
ADOR WELDING LIMITED
Formerly **Advani - Oerlikon Ltd.**

SPECIAL FEATURES THAT ENHANCE VALUE OF MMA DC WELDERS

Rotary power sources (DC Generators)

For many years only DC generators (rotary type) were available and used for DC welding in the SMAW process in all types of welding positions due to its versatile voltage and current (V-I) characteristics . Owing to its excellent drooping characteristic and inherent dynamic response it was very easy for a welder to manipulate the weld puddle without disturbing the arc.

During welding, when a welder wants to control the weld puddle by either long arc or short arc, the generator responds to either increasing arc voltage or reducing voltage by keeping current near set value. This is important especially in short arc mode for pipe welding application where current increases proportionately giving adequate force in the arc. This additional current is essential to avoid arc breaking.

Also the generator output is not affected due to power supply variation and the equipment continues giving consistent performance.

Static DC current power sources

Subsequently diode based static power sources were introduced which matched the arc force of generators, due to its drooping characteristics.

Nowadays, with advances in electronic controls, welding equipments using electronics

Product Update

CHAMP T400

Inverter based DC welder

- Three phase inverter based, high efficiency and high power factor DC Welder
- Enhanced Reliability due to SMD technology
- High frequency IGBT based Rectifier
- Arc force adjustment on panel
- TIG Welding possible with External HF Unit
- Light weight, compact and portable for easy handling

circuits are available that can achieve welding performance to closely match characteristics of DC generators and also offer additional features such as

- Arc Force control
- Hot start feature
- Electrode anti stick feature
- Immune to supply voltage changes
- Compact and light weight -inverter type of equipment
- Substantial saving in energy bills
- Low maintenance cost
- Various protections

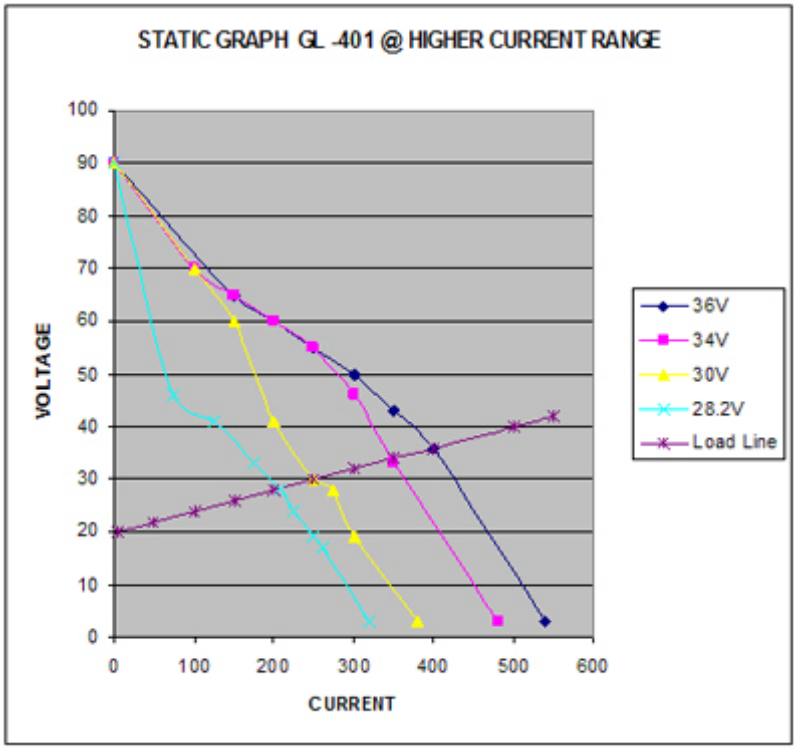
In this article we will highlight the importance of some features

1) Arc force control

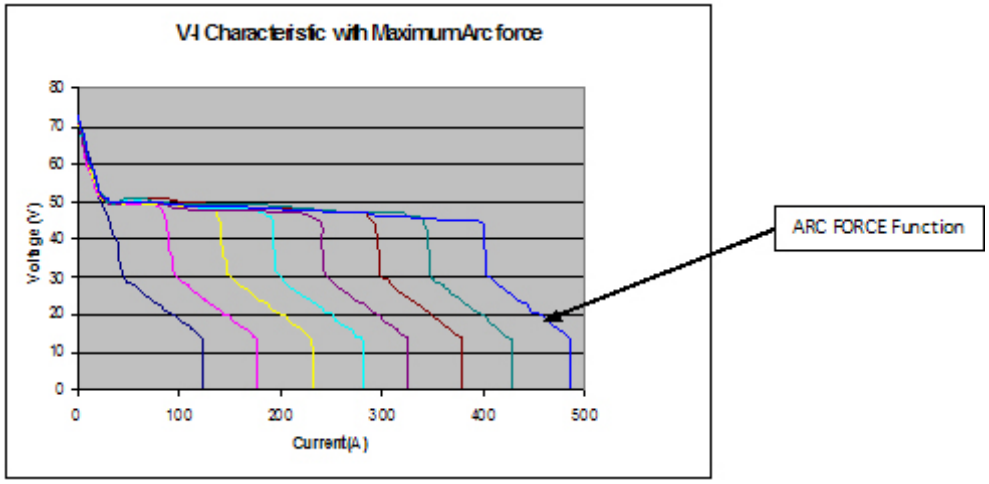
This control is provided in front panel of equipment and can be set by welder depending on diameter of electrode. In short arc mode, special circuit gives additional current to set value which is inversely proportional to distance between electrode tip and base metal. This feature is very useful when you are pushing the electrode in the root of joint. When you do not want this additional amperage you can keep control to its minimum position.

In case of TIG process, arc force control is not required since TIG welding needs true constant current. Hence when we select the TIG process, the arc force function is disabled by TIG/MMA process selection switch. This flexibility is possible only because of state of the art technology.

As mentioned earlier, a diode based SMAW welder possesses drooping characteristics and a separate arc control is not required. Following Graph shows the V-I characteristic (drooping characteristics) of a diode based SMAW Welder.



In case of Inverter based SMAW welder, the current is inversely proportional to arc voltage with the help of arc force control. The following graph shows the V-I characteristics of this type of power source.

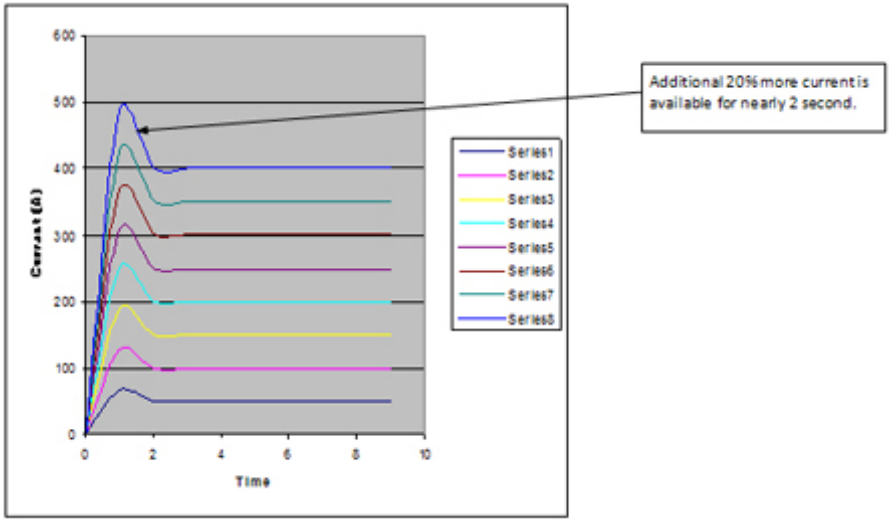


2) Hot start

Welders find difficulty in striking and starting the arc with some electrodes, particularly with basic coated electrodes. In this case the hot start feature is very useful.

When ever the welder strikes the electrode, higher than set current will flow for predetermined time and will return back to set value. This feature is popularly known as **hot start**. This amount of excess current can be set by user if this control is provided on front panel of the machine. Normally this excess current is a percentage of the actual set current. Some times, hot start feature is built in and is fixed with respect to set current. Many equipment have hot start as a built in feature (e.g. CHAMP T400, THYROLUXE 400 and others manufactured by Ador Welding Ltd.)

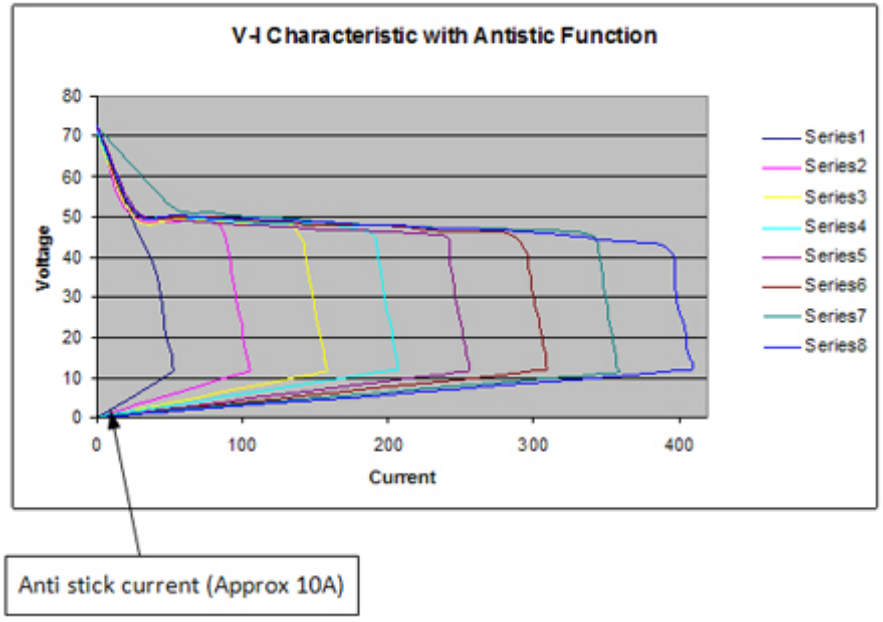
Following graph shows the Hot start Function in CHAMP T400, where an additional 20% of set current is available at start of arc for nearly 2 seconds.



3) Electrode anti stick circuit

During welding when distance between electrode tip and job reduces and eventually the electrode touches the base metal, the arc voltage becomes almost zero; in this case it cannot sustain the arc and electrode gets stuck to job. The set current continues to flow through electrode and welder cannot release electrode from base metal as long as current is flowing through electrode. Provision of a special anti stick circuit releases the electrode within 2-3 seconds by reducing current to minimum value.

Following graph shows the **anti stick** function that gets enabled once the arc voltage goes bellow 12 V. The welding current reduces to 10A, thereby releasing the electrode.



4) Step less control of welding current

Due to electronic controls it is very easy to set required current without any step adjustment allowing welder to set any value current within the range. This is possible due to power electronic circuit. The low control signal levels make it easy to adjust current from remote place making equipment more welders friendly.

All the above controls add value to the welding equipment and very useful for the users.

Ador Welding Ltd. range of DC MMA welding equipment (rotary and static type)

Ador Welding Ltd. has many MMA DC welders based on various technologies like diodes, thyristors, chopper type and the latest inverter technology. CHAMP T400 is one of these equipment built with the latest inverter technology, which has all the above and more features. Please refer to chart below for selection of DC MMA welders.

Sr. No.	Model Name	Current Rating	Arc Force	Hot Start	Antistick	Stepless control
	Motor Driven Welding Generator					
1	SUPERGEN 320	320A	By Drooping Characteristic	Not Required	Not Required	✓
	Engine Driven Welding Generator					
2	SILENT CHALLENGER 301	300A	By Drooping Characteristic	Not Required	Not Required	✓
3	SILENT CHALLENGER 401	400A	By Drooping Characteristic	Not Required	Not Required	✓
4	SILENT CHALLENGER 501	500A	By Drooping Characteristic	Not Required	Not Required	✓
5	SILENT CHALLENGER 2x301	2 x 300A	✓	Built In	✓	✓
	Diode Based MMA Welders					
6	GL 400	400A	By Drooping Characteristic	Not Required	Not Required	✓
7	GL 600	600A	By Drooping Characteristic	Not Required	Not Required	✓
	Thyristor Based MMA Welders					
8	Throluxe 401	400A	Built In	Built in	Not Available	✓
9	Throluxe 600	600A	Built In	Built in	Not Available	✓
	Chopper Based MMA Welders					
	CHOPREC 401	400A	✓	Built in	✓	✓

	Inverter Based MMA Welders					
10	CHAMP 165	160A	Built In	Built in	✓	✓
11	CHAMP 203	200A	Built In	Built in	✓	✓
12	CHAMP 253	250A	✓	✓	NA	✓
13	CHAMP T400	400A	✓	Built in	✓	✓
14	CHAMP 400	400A	✓	Built in	NA	✓

For further details visit us : www.adorwelding.com or write to us : cmo@adorians.com for more information on these special features and help in finalizing your requirement of welding equipment for specific applications.

Project Engineering Solutions

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