

Speciality Welds



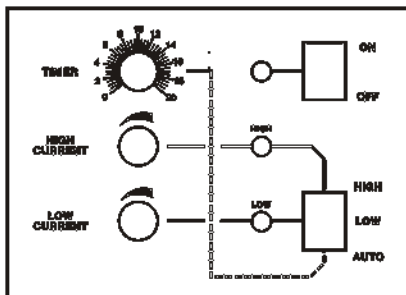
Hammerhead™ 'Wet-Spot' Welding System



New Welding System offers unrivalled benefits in nil visibility, without the need for skilled welders. The Hammerhead welding process has been specifically developed to offer an alternative to conventional wet welding, particularly where very poor visibility exists. The process uses a control system and a specially formulated electrode to offer solutions to long-standing problems associated with conventional welding, in low/nil visibility. Furthermore, welding can take place without the need for traditional joint preparation and can eliminate much of the traditional cleaning requirements associated with conventional welding and will even work through painted structures. The process, while remaining Manual Metal Arc (MMA) provides an effective joining means through use of a system that controls all welding parameters. This involves the control and manipulation of two current settings and a timer, selected against material thickness, prior to diving. Once the basic settings have been made, the diver may make any minor adjustments to ensure adequate weld quality while underwater.



CONTROL PANEL



The control unit has the following controls, which may be set individually or to automatic.

High (1st) current control
Low (2nd) current control
Timer control
Auto setting

The control module is fitted into our standard Piranha (II) range of welding/cutting systems and includes amp and voltmeter, with a 400-amp isolation (knife switch) all built in.



How the system works

Once the system is set to automatic, the diver simply applies pressure to the electrode to 'push' it, in a linear manner, directly through the two materials. The 1st current allows the electrode to pierce the top and base materials creating a hole, through which, both materials will be joined by the weld metal of the 2nd current. When set to automatic, the system will provide the 1st high current for the required time cycle, after which, the 2nd low current initiates. The operator can set the system to manual and select either high or low current only, without the need for the timer. When set to auto the timer controls the depth of penetration, while set on 1st high current. During this operation the diver, or indeed robot, need only apply sufficient pressure (approx. 5-10kgf) to push the electrode through the materials. This allows the electrode to fill up the hole and removes any risk of continuing to penetrate/pierce the base material, thereby, creating an effective spot/plug weld (weld nugget) without the need for any traditional welding skills, or visibility. *It is the aim when welding underwater not to burst through the base (back) material, as this will cause difficulties in sealing. However, should this occur, an effective repair may be made by only using the 2nd current to help fill up any hole.*

System Controls

- 1) Timer** - Provides weld cycle time for high current control. Provides 0.5 second increments and will operate up to a maximum of 20 seconds. This control permits selection of a suitable time interval to allow for adequate penetration.
- 2) High current** - Controls the amperage selected for high current period. Provides the high current control used to penetrate the material(s) i.e. this current creates the hole in the materials. To be used in conjunction with timer control.
- 3) Low current** - Controls the amperage selected for low current period. Provides low current control for suitable weld metal deposition.
- 4) On/Off Switch** - Main on/off switch used to power the system (LED light shows status). The system must be powered to activate the spot welding cycle.

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5) Auto / High / Low Switch – Main switch used to select method of operation (LED light shows status). Auto - When set to auto the system will operate in the two (2) cycle method. i.e. first cycle is high current, which will run for the set time interval, then automatically switch down to low current until the diver completes the weld or the consumable is used. Once the arc has expired the system will reset, ready to start the next spot-weld.

High - When set to high the current is set for high current only. This setting is useful when making a repair or where greater penetration is needed, or to re-weld if any doubt exists as to the quality of any spot weld.

Low - When set to low the current is set for low current only. This setting is useful if a weld profile is not as required, or a hole needs to be filled.

6) Power connection – Main power socket for 110v supply. The system requires 110-volt power.

7) Remote control connection – Main connection between welding machine and control system. The system must be connected to a welding machine via the remote control plug as it is the electronics that manipulates and controls the currents used for welding.

Instructions

Please read this document in full before attempting to use the Hammerhead (HH) control system. After you understand all the component parts and their function, please follow these instructions to set the system ready for use.

1: Connect the mains power plug to socket marked '**mains power**' (ensure mains power is off) and then connect to 110v supply. This power connection is supplied with a 25M length of cable and is fitted with a Buccaneer 400 IP68 rated plug and standard C-type, 3-pin 110v plug.

2: Connect the remote control plug to socket marked '**remote**'. (Ensure the main power switch is off). Then connect to the welding power source.

If you are using a multi-process type power source, ensure 'stick' welding is selected before switching on the power source and HH control. Failure to do so will result in severe damage to the electronics and all warranties will be null and void.

3: You may now power up welding machine and HH control [4] and 110v supply. The LED next to switch [4] will light up. **You can now test the system.**

Note: ensure the welding operator is suitably dressed in protective clothing, suitable for welding.

4: Switch high/low/auto [5] control to '**high**', LED will light up. The current adjustment is now controlled from knob [2]. Ask welding operator to strike an arc. Whilst welding, adjust control knob to check for current adjustment. (See amp meter for changes)

Now switch high/low/auto [5] control to '**low**', LED will light up. Repeat the above steps using the 'low' control knob [3] to ensure the low current selector functions correctly. Once satisfied both controls function as required, you may now select a time interval using control knob [1].

The time required to penetrate the materials will depend upon a number of issues; namely, thickness, position and size

of electrode. You may also notice that different operators use slightly different pressures to '**push**' the electrode into the material. While this is normal, try and ensure all operators use between 5-10kgf. There is no need to use excessive pressure. With the correct time and current settings the electrode will pierce through the materials without use of excessive force.

You are now ready to select a suitable '**high**' and '**low**' current, and a time interval. To use the system in automatic mode, you need to now select switch [5] to '**auto**'. The system will now automatically switch between '**high**' and '**low**' current for the given time interval selected.

The table given below may be used as a starting point to assist in the initial settings. Please note that these may not be accurate for the conditions on site, and these settings may also require further adjustment from trials conducted in air, for use underwater.

Electrode Size: 3.2mm Plate thickness:	Timer:[1]	High Current:[2]	Low Current:[3]
8 - 8mm (16mm)	4-6 Sec	250-260 amps	150-160 amps
10 - 10mm (20mm)	5-8 Sec	260-270 amps	150-170 amps
12 - 12mm (24mm)	7-9 Sec	270-280 amps	160-180 amps

Once the system is set to automatic and after the selected time interval has expired, the system will change from '**high**' to '**low**' current automatically. There is no need to make any further adjustments, as after each weld is completed or the welding operator has broken the arc, the system will reset, ready for the next weld to be made.

The process is designed as a '**single-spot**' technique, i.e. one electrode to make one spot weld. In the event the welding operator needs to make a repair, or has not completed the weld as required the control system can be selected to '**manual**'. In this way, either the high current, or the low current can be selected independently.

If only low current is required, the control switch [5] needs to be selected to '**low**'. This will allow the welding operator to make any repair as required whilst only using the low current. This is ideal for adding extra metal, or to fill any small holes.

If only high current is required then the control switch [5] needs to be selected to '**high**'. This will allow the welding operator to completely penetrate through/over the original spot ready to re-weld.

Once any modification is made, the system needs to be re-set to '**auto**' ready for the next weld.

Local Representative