



Resistance Welding Products

POKE WELDERS



INTRODUCTION

There is often a need for a light Spot Welding Gun that can be held in the hand and used from one side. Typical examples might include the welding of mild steel saddles to hold copper cooling tubes onto stainless, galvanised or zintec panels in refrigeration work, or the welding of stainless steel name or number plates onto a variety of components. Other applications include model work, the welding of thermocouples and strain gauges, and the manufacture and repair of stainless steel heat insulation blankets. The machines are also widely used in the nuclear field for the welding of stainless steel insulation in reactors. The process is primarily designed for light gauge work up to about .75mm, which can be welded to itself or to heavier gauges, and there are a great many applications in this range where it will be invaluable. With heavier duty Guns, cables and larger transformers, it is possible to weld up to 2 x 1.25mm, or 1.25mm to heavier materials.

DESCRIPTION

There are four basic models available, the B.3, the B.12L, the B.13H and the B.70H. The B.3 can be wound for 110v and 240v, the B.12 is wound for 240v and B.13H 415v only. The B.3 is housed in a 'Suitcase' type steel case with a single carrying handle on the top. Both the B.12 and the B.13 are housed in the same style steel case, with heavy duty carrying handles and a recessed brushed aluminium fascia, as illustrated above. On this is mounted the Synchronous integrated circuit Precision Control, giving 1 - 15 cycle Squeeze/Cool times, 1/2 - 45 cycles Weld times selected by a 1/2 cycle, Normal and x3 toggle switch, a 40% - 100% Phase Shift Heat Control and a Single/Repeat weld facility. There are also 'Power On' and 'Weld On' LED's and on the B.12 and B.13, a four-way heavy duty primary Heat Tap Switch. Power is switched by a pair of Thyristors, and the inbuilt accuracy enables welding down to 2 x .05mm ferrous metals. The B.70H is based on a 70kVA transformer, and is always used with 300 MCM water-cooled cables and the PG6 heavy duty Gun. It is usually built to order, so can be designed to suit a particular requirement, often being trolley mounted complete with a water-cooling tank giving stability to the unit.

The B.3 has a 2.2kVA transformer with a secondary voltage of 3.6kv. It does not have a transformer tap switch, heat control being by the phase shift heat control on the fascia.

The B12L Console has a 10kVA 4.5 volt secondary output resin encapsulated transformer. The Console houses the welding transformer which is wound for 240 volts and is connected to one phase and neutral and earth. It has a 4-position rotary switch on the primary giving four main weld heat settings; fine heat adjustment is available on each setting by means of the phase shift control described on the previous page.

The B.13H illustrated on the previous page, has a larger 15kVA 8 volt secondary output resin encapsulated transformer, and is wound only for 415 volts. It has a 4-way rotary switch on the primary giving four main heat settings, again with fine heat adjustment being available by phase shift heat control. The B.13H generally uses the PG3 Hand Gun which can be water-cooled if required for higher duty cycle work. The B.13H is mainly specified for welding heavier gauge materials, when it is used with the PG6 Heavy Duty Gun, for higher duty cycle work, or to allow longer floating leads up to 3 metres instead of the usual 1.5 metres.

The B.50 and 100 are the most powerful unit's in the range, with a either 50 or 100kVA transformer's, and are used for continuous heavy-duty work, with a capacity of up to 1.2mm on 300MCM cables up to three metres long.

The B.3 is fitted with 10mm silver plated secondary sockets into which the output jack plugs from the Gun are fitted. On both versions of the B.12L and B.13H, there are two silver plated secondary sockets, 16mm for the Gun and 18mm for the Earth, into which the corresponding jack plugs are fitted. Plugs are made to take 35mm², 50mm² and 70mm² cables, 50mm² being supplied as standard. One lead ends in an Earth Clamp which is fitted to the work piece as near as possible to the weld. This is usually a special wide copper clamp based on a Vise-Grip sheet metal clamp. Alternatively, the lead can end in a terminal lug which is bolted to a copper backing plate on to which the work piece will be rested during the welding operation, or it can be connected direct to a 'Pliers' type gun. On all models, there is also a switch socket taking the jack plug from the gun.

GUNS

There are several different types of welding gun available, the choice depending on the facility required, the production rates involved and the need for water-cooling. The standard light unit for general use is the PG2 moulded plastic gun. This has a micro-switch in the pistol grip and uses a PW-017 10mm dia. Screw-in probe type electrode which has a 3/8" BSF thread. The Gun weighs only 300 grams and is ideal for the fabrication or repair of stainless steel heat insulation blankets, applying strain gauges and similar light work. For roll-spot work, the PW-018 attachment screws in to the holder of the PG2 Gun in place of the standard probe - also available with a BS807 1/2" taper fitting for use with the PG3 Gun - and is used with the timer set at 'Repeat', and the 'Weld' and 'Cool' times being adjusted to suit the particular job.

For applications where slightly more tip pressure is required, the PG3 medium Gun is to be preferred. This uses the same moulded plastic grip as the PG2 Gun, but has a heavier copper section, takes a 1/2" BS807 taper electrode and may be water-cooled if required to increase the duty cycle. It weighs 450 grams. The PG5 is a hand 'Pliers' type gun, and is particularly suitable for wire and similar work, the making of models or in orthodontic work for example.

The PG5M is a miniature 'Pliers' Gun for really delicate precision work and can be used down to 2 x 0.25mm cross wire welding.

For heavier applications, the PG6 heavy duty Gun is supplied. This has a strong cast aluminium body and an adjustable spring-loaded action. The spring pressure has to be overcome before the switch is triggered by an adjustable plunger. The Gun is normally fitted with 300 MCM water-cooled cables and 1/2" BS807 electrodes. It is always used with the B.13H Console, or with the larger B.50 & 100H units for heavier production applications like the continuous welding of 1.2mm zintec cladding to 50mmRHS.

SPECIFICATIONS

| | | | | |
|-----------------------------|---------------------------|--|------------|---------|
| Mains supply : and Earth | B.3 | 240v 1-phase | 13amp HRC | Neutral |
| | B.12L | 240v 1 phase | 25amp HRC | Neutral |
| and Earth | B.13H | 415v 2-phase | 63amp HRC | Earth |
| | B.50/100H | 415v 2-phase | 200amp HRC | Earth |
| Capacity: | B.3 | 2 x .50mm or .50mm to heavier gauge. | | |
| | B.12/B.13 | 2 x .75mm or .75mm to heavier gauge. | | |
| | PG6 Gun with B.13 | 2 x 1.25mm or 1.25mm to heavier gauge. | | |
| | B.50/ 100 | Dependent on weld gun and specification. | | |
| Secondary Current: | B.3 | 2000amps @ 3.6v | | |
| | B.12L | 2500amps @ 5.8v | | |
| | B.13H | 5000amps @ 8v | | |
| | B.50/ 100 | Dependent on specification. | | |
| Dimensions: | B.3 | 330 x 240 x 350mm | 19Kgs | |
| | B.12L | 495 x 215 x 305mm | 36Kgs | |
| | B.13H | 495 x 215 x 610mm | 40Kgs | |
| | B.50/ 100 | Dependent on specification. | | |
| Gun Weights: | PG2 Light moulded Gun | .30Kgs | | |
| | PG3 Medium Gun | .40Kgs | | |
| | PG5 Pliers Gun | 1.00Kgs | | |
| | PG5M Miniature Pliers Gun | .30Kgs | | |
| | PG6 Heavy duty Gun | 1.50kgs | | |

For wiring schematic see PWE00045 (B13H) and PWE00045/1 (B12L) attached

B.12 & B.13 INSTRUCTIONS FOR USE

INSTALLATION

The B.12 is wound for 220/240 volt operation; B.13H models are wound for 380/425 volt operation. Special windings are available to order on the B.12, in particular 110 volts which is sometimes specified for safety reasons. For 220/240 volts, connect BROWN to Line, BLUE to Neutral and GREEN/YELLOW to Earth as marked. For 380/415 volts, connect BROWN and GREY marked 'LINE' to any TWO PHASES of a three phase supply, and GREEN/YELLOW to Earth. All models have an internally fitted HRC fuse, but the supply should be protected by a suitably rated switch fuse. A 32 amp HRC fuse is recommended for the B.12 and a 63 amp HRC fuse for the B.13H model. Push the 16mm and 18mm Jack plugs fitted on the floating leads respectively from the Gun and Earth firmly into the matching silver plated 'Multilam' sockets on the side of the Console, and the light switch Jack plug into its corresponding socket.

The Earth is normally provided with a sheet metal type clamp with special copper jaws, or the Earth can be fitted with a lug which can be bolted direct to the job or to a suitable copper earth block. These should be clamped as near to the weld area as possible to reduce resistance to the minimum. Sometimes, particularly on larger jobs, it is helpful to fit two Earth cables, one at each end of the work piece, in order to even up the current. The PG5 and the PG5M pliers Guns have twin leads which plug straight into the corresponding sockets. On water-cooled models, usually the larger B.13H when used in conjunction with the PG3W or with the PG6 heavy duty Gun which has water-cooled 300MCM secondary cables, water pipes are connected to the Flow 'F' and Return 'R' 3/8" BSP connectors on the pipes from the Gun. Water flow should be approximately 4 litres per minute.

CONTROLS

All models have a synchronous integrated circuit Precision Control providing 1 - 15 cycle 'Squeeze/Cool' times on the left hand potentiometer, 1/2 - 45 cycle 'Weld' times selected by a 1/2 - Normal - x3 Toggle switch in conjunction with the centre 1 - 15 cycle potentiometer, and 40 - 100% phase shift Heat Control selected on the right hand potentiometer. They have Thyristor switching and Single Spot or Roll Spot facility. There is a four position rotary Heat Selector switch on the right of the panel, and the Phase Shift potentiometer used on each of these Heat settings gives a very wide range of overall heat selection. There are 'Power On' and 'Weld Go' LED indicators, the former showing Mains supply to the Console and the latter flashing each time a weld is triggered.

OPERATION

Check that the Welder is connected to the correct voltage as shown on the serial number plate on the left side of the Console. Switch on mains supply, when 'Power On' LED will light. Set 'Weld' time to 2 cycles, set 'Squeeze/Cool' time to 5 cycles, set 'Single/Repeat' toggle switch to 'Single' and 1/2 - Normal - x3 toggle to 'Normal', switch 4-position rotary Heat switch to '1' and phase shift Heat potentiometer to 40%. Position Earth clamp as close as is conveniently possible to the weld area and, holding the Gun away from the job, depress the micro-switch several times to ensure correct operation. Each time you depress the weld switch, the 'Weld Go' LED will light. Now bring the Gun down to the weld position, hold electrode tip firmly against the surface to be welded, and depress micro-switch.

If using either the PG5 or the PG5M pliers Guns, place a piece of insulation of some sort between the tips to ensure correct operation before carrying out actual weld test.

If using the PG6 spring loaded Gun, push hard against the spring until the black push switch is depressed and the weld fires. On **all** machines, whether the switch is merely touched or held down for the whole weld time, the weld will take place for the actual weld time selected on the timer.

Test the weld obtained, and if not satisfactory, increase the weld heat by turning the tap switch up from '1' to '4', trying welds at each position and on each heat setting, turning the phase shift Heat potentiometer up from 40% to 100% as necessary.

When using the Roll spot technique, set the Single/Repeat toggle switch to 'Repeat', set the 'Weld' and 'Cool' time to suit the application, ensure that the 1/2 - Normal - x3 toggle switch is set at 'Normal' and then, holding the Gun away from the job, hold down the micro-switch, and watch the 'Weld' LED indicating the pulsing of the weld. Adjust 'Cool' time to give required interval between welds. When satisfied with settings, press the roller wheel **firmly** against the job, depress the micro-switch and holding it on, move the wheel slowly along the work piece maintaining as constant a pressure as possible. Ensure that you release the micro-switch **before** removing the wheel from the work piece.

N.B.

1. The **shortest** weld time, consistent with doing a satisfactory weld, is the best as heat in both Gun and cables is kept to a minimum.
2. Better results will be obtained by moving the Earth closer to the weld, than by increasing either the weld time or the weld heat.
3. Keep the electrode tip diameter to the absolute **minimum**.
4. Maximum gauge that can be welded is 2 x .75mm, except with the PG6 Gun with B.13H Console, where 2 x 1.25mm can be welded. In all cases, the maximum thickness can be welded, either to itself, or to anything thicker, if conditions are perfect.
5. Generally speaking, **short** weld times and **high** heat settings will give the best results.

Single Side "Poke" Gun systems

PW poke welders are precision units, with accurate controls giving weld times as low as 1/100 sec. They are extensively used in the aircraft industry, and for other accurate welding needs.

PKGB3 240 Light Console with 240 volt 2.2kVA transformer, with Synchronous Control, complete with 3 metres of 2.5mm primary cable

PKGB3 110 As above 110 volts

PKGB12L Bench Console with 240 volt 5kVA transformer, with 4 heat controls and complete with Synchronous IC Control and 3 metres 2.5mm Primary Cable

PKGB13H Bench Console with 415 volt 15kVA Transformer, with 4 heat controls and complete with Synchronous IC Control and 3 metres 6.0mm primary cable



DBZ-100 and DBZ-300

High precision consoles with medium frequency transformers and milli-second timing. These highly accurate units will weld the thinnest materials (down to 0.02mm) and offer both single spot and repeat functions. The smaller DBZ-100 (left) has full monitoring facilities.



POKETROL Trolley for B12 and B13



B50 and B100 50kVA and 100kVA heavy duty poke welders

These powerful units are intended for heavy duty industrial applications, working either on thicker material, or where higher duty cycles are required.

The powerful transformers deliver over 12kA of welding current through heavy duty watercooled cables, and small pneumatic guns, both C and X-type are available.

Sophisticated but simple controls allow confidence in weld repeatability.



Poke Gun systems

PW has long specialised in these precision, single side welders. Designed for thin or very thin sheets and wires, the welders are used extensively in aircraft and other precision industries, but have many applications in the general industrial world.

PKGPG1 Light Pencil Gun, with 10mm screw-in electrode tip 2x1.5m welding leads, earth clamp and built in microswitch or foot switch initiation. (specify on order). Available with straight tip. PKGPG1/1 shown.



PKGPG2 Light Moulded Plastic Poke Gun, with 10mm screw-in electrode tip, 2x1.5m welding leads, with sheet metal clamp with 75mm copper jaws



PKGPG3 As above but with 1/2" BS807 taper tips
Shown with wheel. Also available with straight tip



PKGPG3W Poke Gun as above but with water-cooled tips and sheet metal clamp.



PKGPG4 Cast Aluminium Twin Spot Poke Gun with 2 x PW-667 electrode tips.



PKGPG5M Miniature Welding Pliers with 3mm dia. electrode tips and lightweight leads



PKGPG5 Standard Welding Pliers with 6mm dia. electrode tips and 2 x 2.5m leads



PKGPG6 Heavy Duty Poke Gun, with adjustable spring loading and automatic switching.



Specialist electrodes

| | |
|----------|-------------------------------|
| PW-014 | 1/2" Button 1/4" Whit. |
| PW-015 | 10mm Button 1/4" Whit. x 22mm |
| PW-015/0 | 10mm Button 1/4" Whit. x 35mm |
| PW-015H | 5/8" Cone 1/4" Whit. x 22mm |
| PW-015G | 5/8" Cone 3/8" Whit. |
| PW-016 | 10mm Button 1/4" shank |

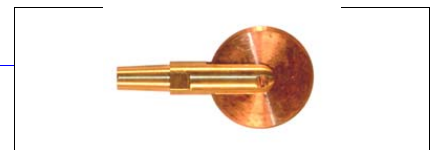


Poke Gun electrodes

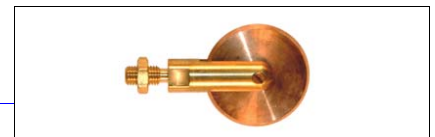
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|----------|--|
| PW-017 | 10mm Probe 3/8" BSF for PG2 Gun |
| PW-1M/PG | Water-cooled Probe for PG3W Gun |
| PW-018 | Brass Wheel Holder, 3/8"BSF for PG2 gun |
| PW-0181 | 50mm dia. Rollspot Wheel |
| PW-0182 | Holder Spindle |
| PW-0184 | Brass Wheel Holder, 1/2" BS807 for PG3 gun |



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| PW-0185 | Wheel Assembly, 1/2" BS807 for PG3 gun |
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| PW-0186 | Wheel Assembly, 3/8" thread for PG2 gun |
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|--------|------------------------|
| PW-019 | Electrode for PG5M gun |
| PW-020 | Electrode for PG5 gun |

