CORROSION CONTROL

EASYBOND

PIN BRAZING UNIT

OPERATION AND MAINTENANCE MANUAL

PART NUMBER 273 199 5660

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CORROSION CONTROL

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EASYBOND MKII PIN BRAZING UNIT

1. INTRODUCTION

Thank you for choosing the **Easybond MKII Pin Brazing Unit**, if operated and maintained as recommended your Easybond MKII should give you many years of reliable use.

Pin brazing is an easy, metallurgically safe method of making electrical connections to steel and ductile iron pipelines, as well as other metallic substrate that are to be cathodically protected, electrically earthed or electrically bonded.

The Easybond MKII is designed for the onsite user who needs a portable, simple to use, reliable, rugged and easily maintained machine to make electrical connections onto metallic structures.

It is important that you carefully read and understand this manual and take time to watch the training video supplied with your equipment prior to operating the Easybond MKII equipment.

2. SAFETY

2.1 SYMBOLS USED

	Read all manuals before using equipment
	Wear overalls during operation
	Wear safety boots during operation
	An exposed surface is very hot and therefore dangerous
	Wear safety gloves during operation
	Wear eye protection during operation
	Wear dust mask during operation
	Wear ear defenders during operation
	Observe the instructions in the text or graphic opposite
	Worn out electrical products that should be sorted for recycling
	Possible dangerous situation that could cause severe or fatal injury

WARNING

2.2 SAFETY REGULATIONS

The safety of staff must be of prime consideration every time that pin brazing work is carried out on the site and a full and comprehensive risk assessment must be completed prior to any pin brazing being undertaken. Pin brazing operators must comply with all current safety legislation and the specific safety requirements procedures of the site and plant owners.

2.3 GENERAL SAFETY WARNINGS

Under no circumstances should the pin brazing equipment and its accessories be operated in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. The equipment will create sparks that may ignite dust or fumes.

Always ensure that the equipment is well maintained and never make any modifications to the equipment or use spare parts and consumables not manufactured or recommended by BAC.

Never operate the equipment when tired, after drinking alcohol, taking drugs, or taking medication that may make you drowsy.

Never operate the AC battery charger outside and in wet conditions.

Keep bystanders away whilst operating the equipment.

Do not abuse the cables and connectors and never use the cables for carrying or pulling the equipment. Always use the optional extension cables when required.

2.4 OPERATOR COMPETENCY

It is highly recommended that operatives undertaking pin brazing for any form of attachment should have attended a BAC approved training course in the pin brazing technique and hold a current certificate of competency.

2.5 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The following personal protective equipment is recommended whilst using the Easybond equipment:

Overalls – conforming to EN ISO 11612:2008 or equivalent.

Safety Footwear – conforming to EN ISO 20345: 2011 S3 or equivalent.

Protective Gloves - conforming to EN12477:2001/A1:2005 Type B or equivalent.

Eye Protection - conforming to EN175:1997/166:1995/169:1992 or equivalent.

Dust/Fume respirator – conforming to FFP3 to EN149:2001 or equivalent.

Note: that when using the optional 18V grinder (part #273 199 0685) you must carefully read the specific instruction manuals for this equipment. The manuals detail the safe operation of the equipment and the PPE required during their use.

3. GENERAL

3.1 THE EASYBOND MKII PIN BRAZING KIT Part # 273 199 5660

The standard Easybond MKII system part # 273 199 5660 is comprised of components detailed in figure 1.

When you receive your Easybond MKII unit check that you have the following:-

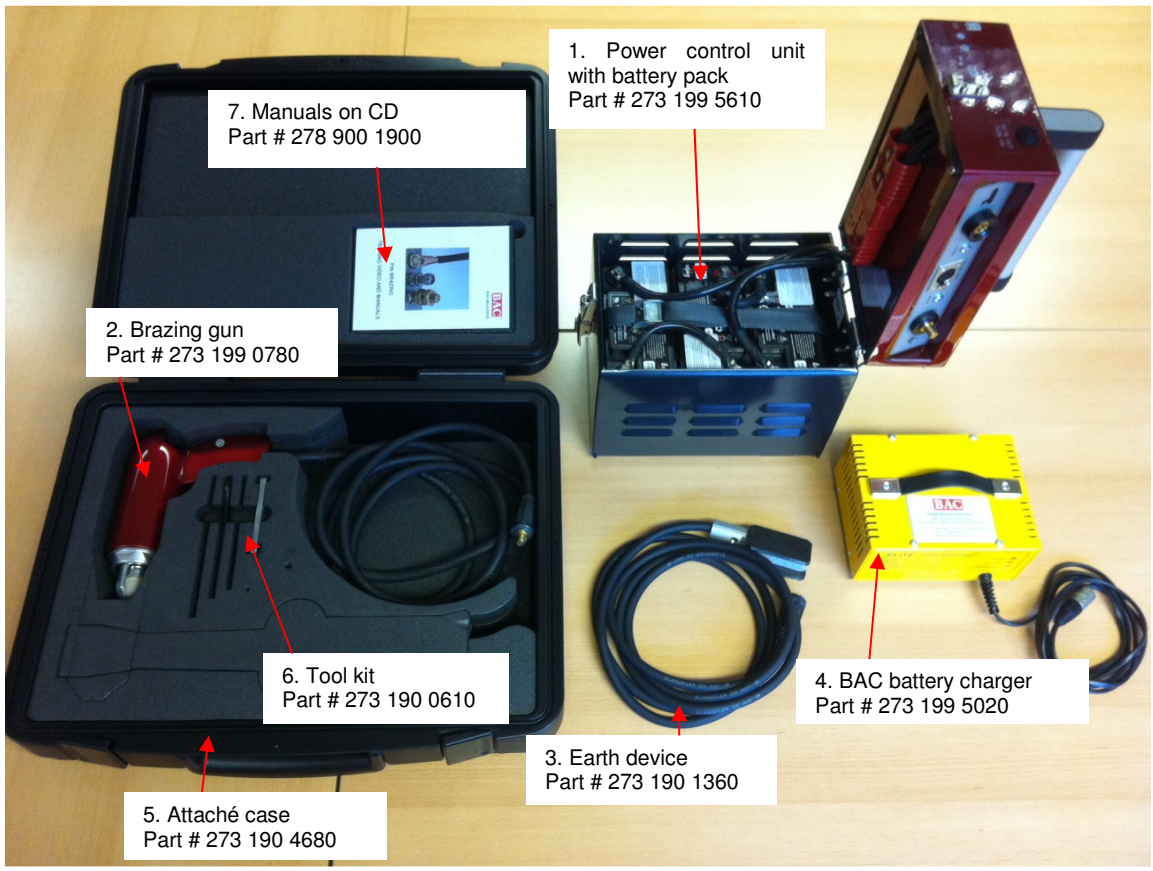


Figure 1

3.2 PART NUMBERS FOR EASYBOND MKII PARTS

Description	Part #	Weight
Easybond MKII System Complete	**273 199 5660**	**31.9 kg**
1. Easybond MKII power control unit *	273 199 5610	21.0 kg
2. Standard gun *	273 199 0780	3.5 kg
3. Earth device *	273 199 1360	1.1 kg
4. BAC Pin brazing battery charger *	273 199 5020	3.0 kg
5. Attaché case *	273 190 4680	3.3 kg
6. Tool kit *	273 190 0610	0.3 kg
7. Manuals on CD *	278 900 1900	
Easybond MKII Power Control Unit	**273 199 5610**	**21.0 kg**
Battery kit (web and 3 x batteries) **	273 199 5630	15.3 kg
Pin brazing enclosure **	273 199 5690	5.7 kg
Re-chargable battery pack with charge adaptor	**273 199 5640**	**15.8 kg**
Battery kit (web and 3 x batteries) ***	273 199 5630	15.3 kg
Charge adaptor ***	273 199 5620	0.5 kg
Optional accessories		
Grinder with 2 x 18V batteries	273 199 0685	5.8 kg
Grinding burr	273 190 1370	0.04 kg
In car battery charger VEPAC	273 199 5040	1.5 kg
Extension cable 2.5m	273 190 1460	1.3 kg
Portable trolley	273 100 4825	6.5 kg

* Included when purchasing part number 273 199 5660.
** Included when purchasing part number 273 199 5610.
*** Included when purchasing part number 273 199 5640.

3.3 PACKING DIMENSIONS

Power control unit: 380mm x 320mm x 420mm

Attaché case: 540mm x 320mm x 160mm

Battery charger: 230mm x 200mm x 120mm

18V grinder case: 470mm x 310mm x 170mm

4. PIN BRAZING

4.1 THE PIN BRAZING PROCESS

The Easybond MKII is powered by a 36V battery pack capable of delivering 240A (ampere) for use with BAC fused brazing pins, ceramic ferrules and cable lugs.

The pin brazing process is initiated by depressing a trigger on the pin brazing gun. The circuit is completed via the magnet attachment to the substrate through which a DC current is passed. The brazing pin tip is the point of highest resistance at which point an arc is drawn, melting the solder whilst simultaneously heating the cable lug material and the surface of the structure to the required soldering temperature.

After approximately 1.5 seconds the circuit is mechanically broken as the fuse wire breaks, the solenoid is de-energised and the brazing pin is held into the molten pool of brazing alloy. The brazing pin tip, alloy, flux and cable lug (if used) rapidly cool into a homogenous unit achieving a very strong connection onto the substrate.

4.2 WET WEATHER USE

Pin brazing attachments can be successfully made to wet metal and in mildly inclement weather, i.e. light rain, drizzle or snow.

However, heavy rain may cause the pin fuse wire to burn out prematurely resulting in no bond being made.

4.3 COLD WEATHER USE

It is possible to undertake pin brazing attachments to metals at sub-zero temperatures. However, the efficiency of the batteries will be reduced in colder weather. Therefore, where practicable, shield the battery pack from extreme cold.

4.4 PIN BRAZING CONSUMABLES (Brazing Pins, Ceramic Ferrules and Cable Lugs)

The Easybond MKII Pin Brazing unit uses BAC fused pins to make the electrical connections. Each brazing pin is tipped with low temperature brazing alloy and the correct amount of flux, and has attached a copper fuse wire at the other end, which acts as a timed circuit breaker to control the duration of the braze. Refer to section 6.

4.5 STORAGE OF UNIT

The unit is to be stored in any dry room or cabinet where a constant power supply to the battery charger can be made available.
There must be adequate ventilation at all times to prevent possible build up of gas evolved from the batteries during charging.

It is recommended that the batteries be stored at an ambient temperature of 25℃ (77℉)

4.6 TRANSPORT TO/FROM SITE

The unit can be transported safely in the rear of a vehicle when secured to prevent movement.
The unit can also be supplied with an optional trolley that can be used to transport the pin brazing unit around site.

5. INSTRUCTIONS FOR THE PREPARATION OF THE EASYBOND FOR OPERATION

5.1 CONNECTION OF THE EASYBOND

The various components of the Easybond MKII are connected as detailed in **figure 2**.

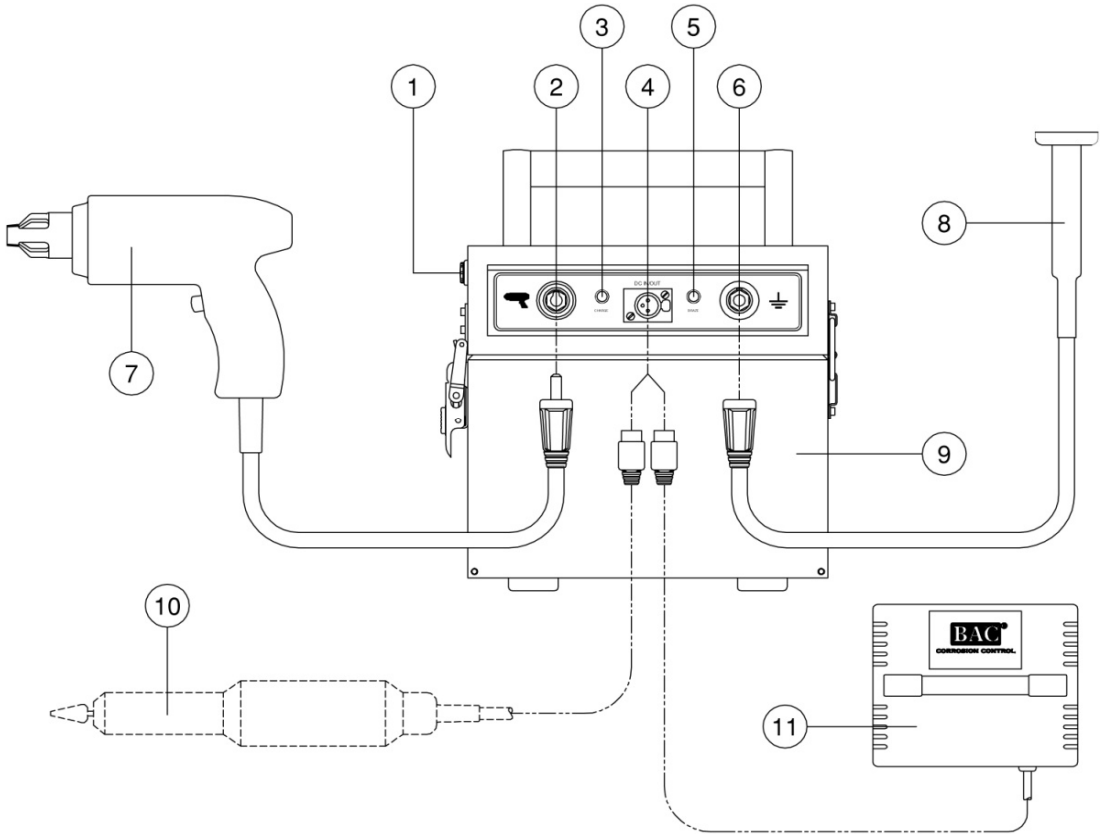


Figure 2

Item	Description
1	**Fuse 15A** (Part # 010 011 0782)
2	**Brazing gun plug socket**
3	**Energy monitor system - Charge LED red (low battery warning)**
4	**DC socket for 42V grinder or battery charger**
5	**Energy monitor system - Braze LED blue (OK to braze indicator)**
6	**Socket for earth device**
7	**Brazing gun** (Part # 273 199 0780)
8	**Earth device** (Part # 273 190 1360)
9	**Power control unit with battery pack** (Part # 273 199 5610)
10*	**42V Grinder** Part # 273 199 0680 (no longer in production)
11	**BAC battery charger (mains)** (Part # 273 199 5020) **or In car battery charger VEPAC** (Part # 273 199 5040)
*	This item has been replaced with a standalone 18V battery operated die grinder (Part #273 199 0685)

5.2 CONNECTION OF BATTERY PACK

On receipt of your Easybond MKII you will need to fully recharge the battery pack.

Due to possible lengthy shipping times and unavoidable temperature shifts during transportation, the power control unit will arrive with the battery pack disconnected. Before using the equipment for the first time the battery connector must be connected and the power control unit put on charge until the battery pack is fully charged.

To reconnect the battery pack open the lid of the power control unit (figure 2 -9), accessible by undoing the safety latch, and connect the red male and female plugs that are located on the power control unit lid.

The battery pack should then be fully charged using only the recommended battery chargers. The unit should then remain on trickle charge for at least 24 hours before normal use can commence. Refer to section 10.2 battery charger

WARNING **WHEN BATTERIES ARE ON CHARGE ALWAYS LEAVE THE POWER UNIT BOX LID IN THE OPEN POSITION.**
NO SMOKING OR NAKED FLAMES AS EXPLOSIVE GASES MAY BE EVOLVED.

5.3 ENERGY (Braze/Charge) MONITOR

The Energy Monitor System constantly checks the battery condition and is able to assess whether there is sufficient power available for optimum braze results and safe use of the equipment.

Recovery mode - The red LED flashes when the voltage drops below 36.30V. This occurs during brazing and whilst the batteries are recovering.

Re-charge mode - The red LED will permanently illuminate when the unit has remained below 36.30V for a period indicating that battery recovery time (approximately 10 seconds) has been insufficient and requires fully re-charging.

System ready - The blue LED signals the system is safe to be used (36.40V+).

System standby - Represented when both red and blue LED's are off, this indicates that the voltage is below that which is required for safe use of the equipment but battery recovery is imminent (36.30-36.39V). Once recovered the blue LED will illuminate. If a brazing operation is attempted whilst the unit is in Standby then the red LED will permanently illuminate to indicate the system must be fully re-charged.

Once the battery charger is attached directly to the Easybond MKII it is possible that the blue LED will immediately illuminate. This however does not indicate that the system is now ready for safe use. Whilst on charge the battery status must ONLY be monitored via the LED's on the battery charger unit. See section 10, Battery charger.

Do not attempt to braze when the unit is in standby, recovery or re-charge mode.

6. PIN BRAZING CONSUMABLES

Easybond MKII consumables are available as direct pins for attachment of pin brazing cable lugs and threaded pins of various sizes. All Easybond MKII pins have a fuse wire.

BRAZING PINS

Brazing pins are available in direct connection or threaded formats of various sizes. The pins must be kept dry, stored in delivery tins and care must be taken not to mix different part numbers.

CABLE LUGS

BAC cable lugs are specially manufactured in the intended material for pin brazing. The lugs are made in three different types. M1 is pin brazed to the cable. M2 is crimped to the cable and the "stinger" is pin brazed with the cable. The "stinger" permanently connects anode wires with a small diameter to pipes utilising the unique silver alloy BAC pin brazing method, without the use of cable lugs, crimping or old exothermic reactions. The lugs must be kept dry, stored in delivery tins and care must be taken not to mix different part numbers.

Always use BAC approved crimping methods to ensure adequate contact.

CERAMIC FERRULES

A new ferrule must always be employed in pin brazing (the ferrule must be changed after each brazing operation). The purpose of the ferrule is to prevent splattering of the molten solder, to prevent oxidation of the molten solder, and to protect the operator against radiation from the arc. The ferrule must be kept dry, stored in delivery tins and care must be taken not to mix different part numbers.

REDUCING SLEEVES

Sleeves are manufactured to allow smaller cables to be crimped into larger than usual lugs. The cable is inserted into the sleeve, then the sleeve and cable are inserted into the lug. All three items are then crimped together.

⚠ WARNING If you are offered any pin brazing consumables from sources other than from BAC directly or a local BAC appointed Distributor/Agent then we strongly advise that you do not use those consumables with BAC pin brazing equipment to avoid any serious risk to people, pipelines and BAC pin brazing equipment. If in doubt contact BAC.

All BAC products are manufactured to the highest standards under our ISO 9001:2008 procedures. If the use of non BAC pin brazing products and consumables is evident then warranties will be void. All BAC pin brazing supplies now carry the following notice:

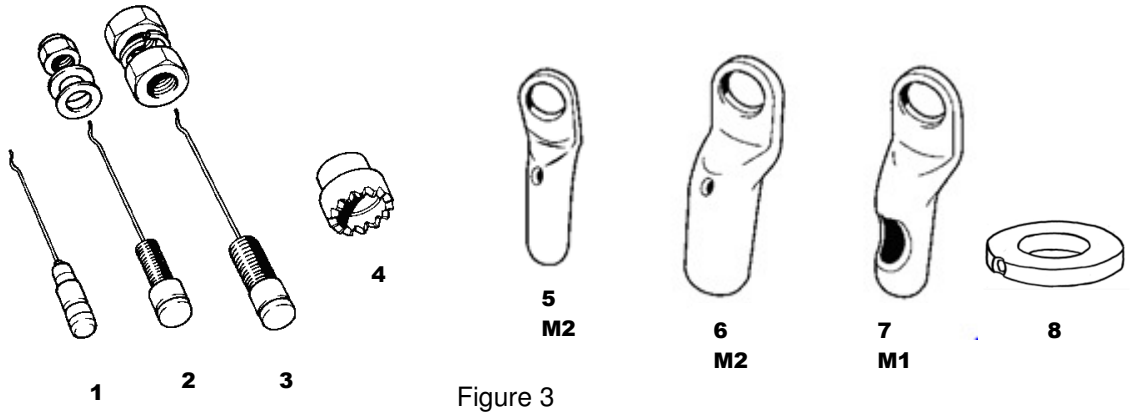


Figure 3

Item	Part #	Description	DIMS	Pack Size
1	278 190 3250	8 mm direct brazing pin	∅ 8 mm	100
1	270 083 3520	Direct brazing pin, extra solder	∅ 8 mm	100
4	270 065 7230	Ceramic ferrule for direct pin	∅ 8 mm	100
2	278 190 0430	M8 Threaded brazing pin *(includes nuts and washer)*	12 x 30 mm	50
3	278 190 3450	M10 Threaded brazing pin *(includes nuts and washer)*	12 x 34 mm	40
3	278 190 2560	M12 Threaded brazing pin *(includes nuts and washer)*	12 x 34 mm	40
4	270 077 3680	Ceramic ferrule for threaded pin	∅ 12 mm	50
5	278 100 7360	M2 Cable lug 10 mm^2 cable	6 x 9 mm	100
5	278 100 9000	M2 Cable lug 16 mm^2 cable	6 x 9 mm	100
6	270 088 7800	M2 Cable lug 25 mm^2 cable	8 x 12 mm	50
6	278 100 7810	M2 Cable lug 35 mm^2 cable	9 x 13 mm	50
6	270 088 7790	M2 Cable lug 50 mm^2 cable	11 x 14 mm	50
8	278 100 8012	Stinger #12AWG (1 - 2.5mm^2)	∅ 17 x 3 mm	100
8	278 100 8042	Stinger #10AWG (4 - 6mm^2)	∅ 17 x 5 mm	100
	278 100 8050	Stinger #12AWG kit *(includes stinger (278 100 8012), brazing pin (278 190 3250) & ferrule (270 065 7230))*		50
	278 100 8060	Stinger #10AWG kit *(includes stinger (278 100 8042), brazing pin (278 190 3250) & ferrule (270 065 7230))*		50

Failure to store consumables correctly can result in defective bonding work.

7. OPERATION OF EASYBOND PIN BRAZING UNIT

7.1 PREPARATION OF THE SURFACE

It is crucial that to achieve a successful pin braze, the area of connection onto the pipeline (or other metal substrate) has a clean bright metal finish. In order to achieve this some degree of surface preparation will be required.

Pipeline and plant owners often have their own procedures for surface preparation and you should fully familiarise yourself with these procedures prior to any surface preparation works.

STEP ONE

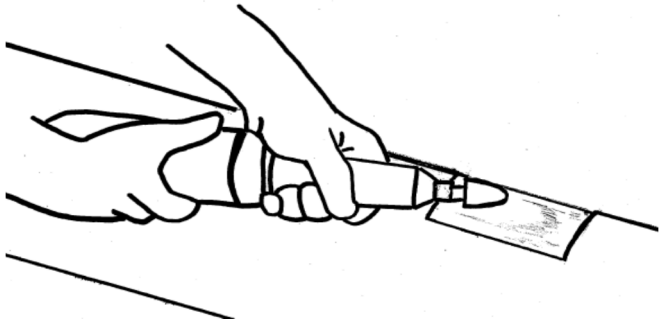


Figure 4

If necessary, the surface encompassing the pin braze area and adjacent earth connection shall be degreased before any grinding operation.

Scrape and clean the steel and clean an area for the earth device as near as possible to the braze area as illustrated in STEP ONE - figure 4.

The metal surface must then be prepared to a bright clean finish to ensure a sound electrical connection between the earth device and the substrate. Never continuously work the metal such that any wall thickness is reduced.

An area sufficient to accommodate the brazing pin and cable lug must be correctly located and cleaned to a bright metal finish.

To prevent the cleaned metal surface re-oxidising, we recommend that pin brazing must take place as soon as possible after surface preparation, i.e. not more than 5 minutes delay.

Note that when using the optional 18V grinder (part #273 199 0685) you must carefully read the specific instruction manuals for this equipment. The manuals detail the safe operation of the equipment and the PPE required during their use.

7.2 LOADING THE PIN INTO THE BRAZING GUN

Load the gun with a brazing pin and ceramic ferrule individually by hand. Ensure that they are both back fully inserted and tight with the palm of your hand, as illustrated in STEP TWO – figure 5.

STEP TWO

Figure 5

DO NOT STRAIGHTEN THE KINKED END OF THE PIN FUSE WIRE.

The legs of the pin holder must be adjusted as necessary to ensure a firm grip of the pin while maintaining concentricity with the ferrule holder.

Important:

Under no circumstances should a brazing pin which has been inserted and then removed from the gun be re-inserted and used for brazing without checking the kinked end profile and fuse wire connection to pin.

7.3 ADJUSTMENT OF BRAZING GUN

Before connecting the earth device to the steel, adjust the brazing pin "Lift Height" as follows:

Hold the cable lug or stinger flat on the steel surface (for direct pin connection). Insert a loaded brazing pin into the hole in the lug and press the gun/ferrule against the surface of the lug evenly overcoming the internal spring. Turn the ferrule holder until the white adjustment indicator tube is flush with the gun's rear face. The brazing gun should now be correctly set, as illustrated in STEP THREE – figure 6.

When using threaded brazing pins, i.e. M8 brazing pin, the ceramic ferrule must be flat against the steel surface when checking the white adjustment indicator tube.

STEP THREE

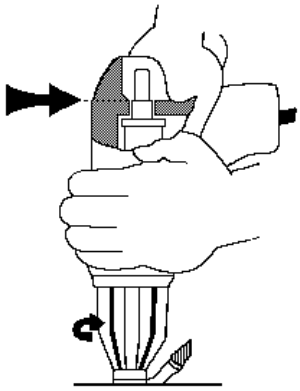


Figure 6

7.4 LOCATION OF CONNECTIONS

The desired position of the required pin braze area should be accurately marked on the steel. Do not use any oil based marker e.g. spray paint, as this will contaminate the grinding burr.

When pin brazing onto a coated pipeline then sufficient coating needs to be removed in order to accommodate both the earth device and area of the pin braze, this would be a minimum of 14 cm x 4 cm using the standard earth device. If the earth device is placed on a separate earth point on the pipe then the area required at the pin braze point will be a minimum of 4 cm x 4 cm.

7.5 PIN BRAZING

STEP FOUR

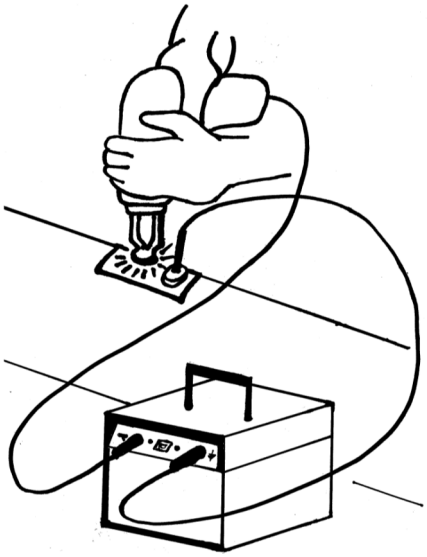


Figure 7

1. The magnetic earth device must be applied to the cleaned surface to ensure a sound electrical circuit.

2. The brazing gun must be correctly adjusted with the correct pin and ferrule fitted.

3. Locate the brazing pin so that the pin is in the centre of the hole in the cable lug. For vertical surfaces, the pin must be at the upper part of the hole in the cable lug.

4. Apply sustained pressure on the brazing gun so that full contact is made between the ferrule and the bond attachment (or the steel surface when using threaded pins).

5. When the operator is ready to braze, he should look well to one side to protect his eyes from glare. The operator's stance should be stable to enable this movement to be made without altering the critical positioning of the gun.

6. Hold the gun firmly and close the circuit by squeezing the trigger.

KEEP THE TRIGGER DEPRESSED UNTIL THE BRAZE IS COMPLETE

7. After about 2 seconds the fuse wire should rupture, disconnecting the circuit. The arc will extinguish and the pin or stud will be shot forward into the molten filler.

8. In the event of a fuse not rupturing after the normal time, the gun must be withdrawn completely from the work, keeping the trigger depressed.

9. After the fuse has ruptured, the gun must be held in place for a further 3 seconds to allow the braze to set

10. Remove the gun by pulling straight off the pipe or substrate in line with the brazed pin, then break out the ferrule if this is remaining in the ferrule holder. This can be achieved by levering against a suitable edge. Beware, it may be hot.

11. Hold the gun in a vertical position then depress the ejector button to expel the remaining fuse wire. Catch the wire in your hand to ensure it has been ejected, as illustrated below in figure 7(a).

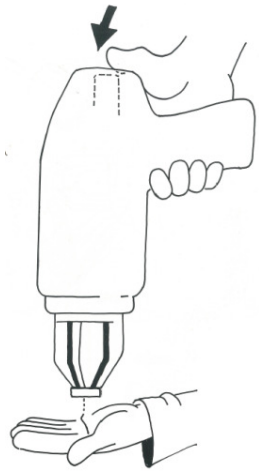


Figure 7(a)

7.6 TESTING A COMPLETED BOND

Threaded pin attachments should be tested by a torque device. For an M8 pin the torque device should be set to 10 Nm. The threads will fail at 25 Nm so do not use excessive force.

Direct braze pin attachments must be tested as per STEP FIVE – figure 8 as follows:

The shank of the plain pin must be carefully broken off with a hammer taking care not to damage the lug. This must be done before another pin braze is made to the bond. After breaking off the shank the broken surface should be level or thereabouts with the outer surface of the lug (figure 9 [A]). The lug shall be complete in all aspects.

STEP FIVE

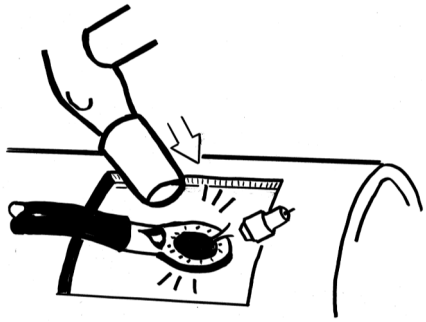


Figure 8

If the surface of the broken pin is proud of the surface of the lug this is an indication that the brazing time was too short * (figure 9 [B]). The reason for a short braze time is usually the result of excessive current being drawn due to the gun "lift height" being incorrect. This short time can also be caused by a poor earth connection.

If the surface of the broken pin is below the surface of the lug, this is an indication that the brazing time was too long (figure 9 [C]). The reason for a long braze time is the result of insufficient current being drawn. Insufficient current is usually the result of a poor battery condition.

If it is known that the battery is good then the cause may be incorrect setting of the gun "lift height".

If the ferrule is not held against the copper lug and is in partial contact then the arc can escape out of the gap and this will result in the side of the copper lug burning away.

Warning: Repeated bond attempts must not be made at the same position as this may cause structural/metallurgical damage to the base steel.

**** When using cable lugs part number #278 100 9000 /#278 100 7360 this result (figure 9 [B]) is acceptable due to thickness of copper material at braze area. Height of remaining brass shank should not exceed 2mm.***

8. FAULT DIAGNOSIS OF UNSATISFACTORY PIN BRAZE CONNECTION

Some common problems can be experienced by operators when first using the equipment. Listed below are a series of faults together with the most likely cause and remedy solutions. In the event of persistent problems or faults, contact the service engineer for advice or repair.

PROBLEM	POSSIBLE CAUSE	REMEDY
No arc or there is a short "pop" of the pin	Circuit not complete or highly resistive	*Check fuse wire on pin is engaged* *Check earth device is connected*
	Batteries flat	*Charge/replace batteries*
Arc time too short Figure 9 (B)	Excessive current drawn Poor earth connection	*Check gun adjustment* *Reset earth connection*
Arc time too long Figure 9 (C)	Insufficient current drawn	*Check gun adjustment* *Recharge batteries*
Bond falls off when tested	Too short brazing time Base metal not clean enough	*See above* *Thoroughly clean the area to be brazed*
Fuse wire stuck in contact nipple	Pin loose in holder Failure to eject previous fuse wire	*Tighten fit of pin holder jaws* *Replace contact nipple*
Brazing pin fails to push into molten braze material	Pin is out of line from the ferrule due to off centre ferrule holder jaws caused by heavy removal of spent ferrule	*Take care not to bend ferrule holder jaws when removing spent ferrule* *Replace ferrule holder*

A. ☑ **B.** ☒ **C.** ☒

Figure 9

9. EQUIPMENT CHECK

When the equipment is in use, time must be allowed during a working period to carry out the necessary checks and servicing required. Carrying out these procedures will prevent time wasted on site, when work is aborted due to faulty equipment.

Time and personnel must also be allocated to the general servicing of equipment on a routine basis. Refer to the maintenance manual in section 12 for more information.

If the servicing procedures set out in this instruction manual have been correctly carried out and a problem still exists contact the sales department at BAC Corrosion Control for advice on +44 (0)1952 290 321 or sales@bacgroup.com.

If it is necessary to return the equipment for repair, ensure that the complete pin brazing set, including all ancillary equipment, is despatched to permit full functional testing.

10. BATTERY CHARGER

PART NUMBER 273 199 5020

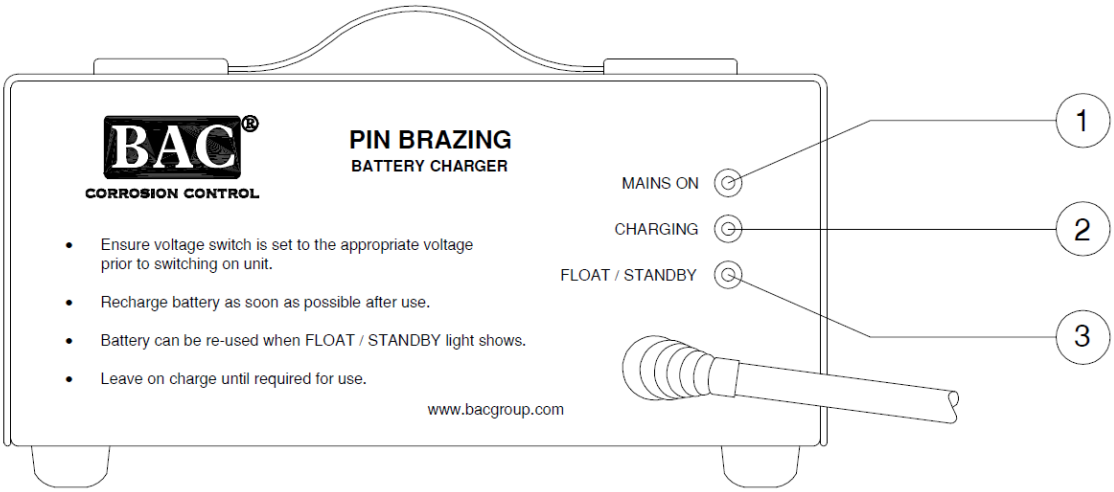


Figure 10

The BAC pin brazing battery charger is a 36V 2A, eight-step charge microprocessor controlled charger, designed to quickly and effectively restore discharged 36V sealed valve regulated lead acid battery packs. The charger is specially optimised to be used with all BAC pin brazing units.

Light # (figure 10) Colour	Condition
1. Red	Mains On
2. Yellow	Bulk Charge
3. Green	Float / Standby

10.1 SAFETY

This appliance must be earthed and it is for AC input only - see rating label on charger for details. It is for indoor use only - do not expose to rain or moisture.

Disconnect the AC mains supply before connecting or disconnecting the charger from the battery.

If the AC power lead is damaged, this appliance should not be used.

If the plug supplied with this appliance is cut from the power supply cord so that another plug can be fitted, it must be disposed of safely. If such a plug is inserted in a 13A socket outlet the cut end of the cable would present a shock hazard.

If a 13A non-rewired plug is fitted to this appliance it must be fitted with a three amp (3A) BS1362 fuse. The fuse cover supplied must be re-fitted if the fuse is changed. If the fuse cover is lost, the plug must not be used until a replacement is obtained.

Batteries may emit explosive gas mixture - prevent flames and sparks.

Do not attempt to recharge non-rechargeable batteries, they may explode.

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire, which is, coloured green and yellow must be connected to the terminal in the plug, which is marked with letter E or by the earth symbol or coloured green or green and yellow.

The wire, which is coloured blue, must be connected to terminal, which is marked with the letter N or coloured black.

The wire, which is coloured brown, must be connected to the terminal, which is marked with the letter L or coloured red.

If the fuse fails in the appliance it must be replaced with a fuse of the same value - in case of difficulty consult the supplier.

If the supply cable of this appliance is damaged, it must only be replaced by a repairer appointed by the manufacturer because special tools are required.

There are no user-serviceable parts in this charger.

10.2 INSTRUCTIONS FOR USE

1. Ensure that the voltage input selector switch is correctly set to the mains supply.
2. Connect the output lead to the battery pack.
3. Connect the charger power cable (plug) to the AC power outlet and switch on. The LEDs will cycle through a self-diagnostic check. The light sequencing is referenced below.
4. Allow 24 hours of charging before your first use of the batteries.

10.3 LIGHT SEQUENCE INFORMATION:

Please note that due to a software upgrade, the light sequence is as follows:

Red	Power on
Yellow	Bulk charge
Yellow (flashing)	Proportional timed charge
Green	Float charge
Red (flashing)	Over run timer on proportional timed charge and can also indicate a possible defective battery.

Charging Steps:

Red Mains Red Charge Yellow Bulk Charge Green Fully Charged

1 Stage one: Self Check

At power up a Self check - LED illuminate one at a time. Red Yellow Green

2 Stage two: Power Interruption Protection

Battery voltage goes straight to full voltage in less than two minutes, it goes straight to solid green (Status as Stage 6)

3 Stage 3: Excessive Discharged Battery

Battery too low to recover = Red Charge flash. Rapid twice per second charger will not start to charge

4 Stage four: Deeply Discharged Battery Recovery Mode

Battery in recovery mode soft start = Red Charge Yellow flash alternate.

5 Stage five: Main Bulk Charge

Battery in bulk charge = Solid yellow

6 Stage six: Proportional Timing Optimisation Charge

Battery in last bulk charge, 80% charged = Yellow flash.

7 Stage seven: Fully Charged Float Maintenance

Battery full = Solid Green.

8 Stage eight: Fail To Charge Safety Time Out

Battery failed to charge = Red flash slow flash (on for two seconds off for one).

Should the charger detect a faulty battery it will flash red instead of holding solid green during the float charge stage.

EIGHT-STEP CHARGE PROFILE

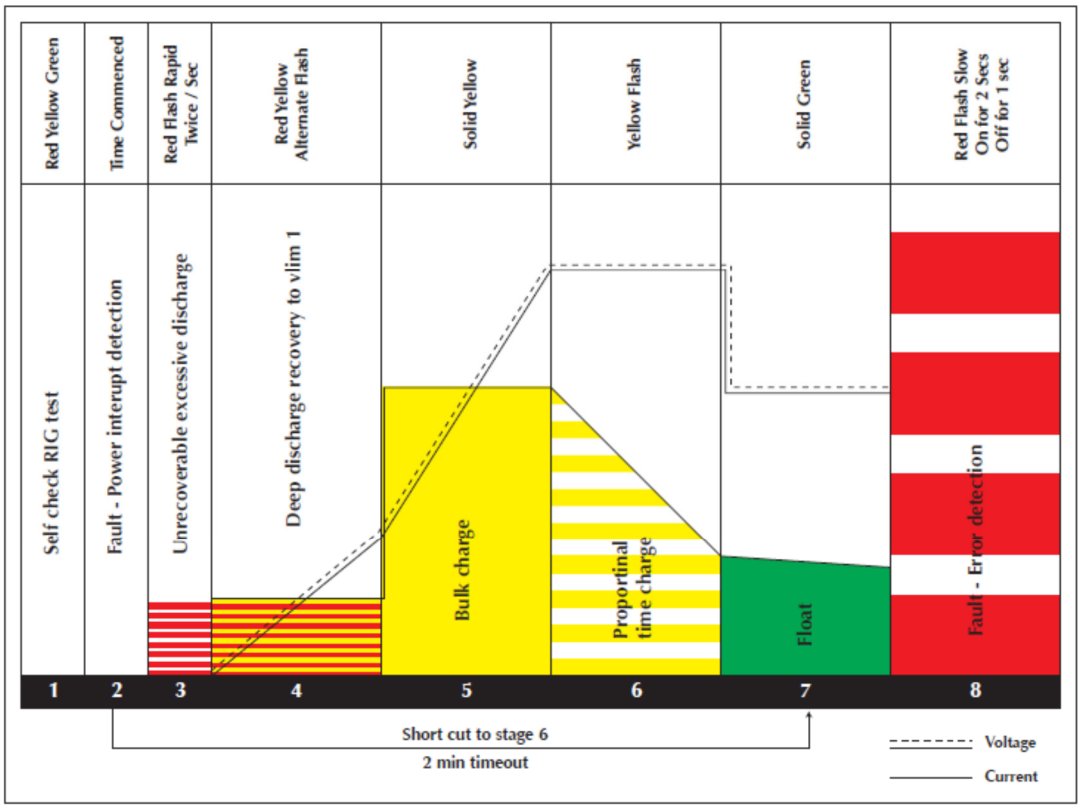


Figure 11

The battery will not be fully charged when the charger switches from absorption to float. The battery will need a minimum of 16-24 hours on float charge before it is fully charged. The battery can be used as soon as it enters float charge, however repeatedly cycling without the necessary 16-24 hours on float will cause premature failure and reduce the life of the batteries.

10.4 BATTERY CHARGER TROUBLESHOOTING

Inspect the charger for damage or loose components from mishandling or transport. The unit should not rattle or have any loose parts.

Make sure the charger is being used on the correct input voltage and the selector switch matches the input voltage.

Make sure the batteries have been connected correctly and there is not an issue with the polarity of the connections.

Disconnect the charger from the battery turn off the mains power and wait 1 minute before reconnecting the power.

- Do each of the LEDs turn on one at a time then leave the red power light on?
- This is a self-check of the charger and confirms the charger is free of faults.
- Manually check the leads to the charger for any damage.

Switch the charger back off, connect the charger to the battery, switch back on, the lights should now flash in sequence again. The yellow charging light should now illuminate.

Is there any voltage in the battery?

If yes, it needs to be > 18V to make the charger work. Make sure voltage is measured across all three batteries in series

Has the battery unit been left on and thus discharged the battery?

If yes, turn off and wait a few hours, then try again to charge the unit.

If unsure, try the charger on another unit. If the charger works on another unit, then the fault is with the main unit, and not the charger.

Do not measure the output voltage of the charger without connecting to a battery. With no battery connected the battery charger output will be 0V (zero). This is not a fault.

Check the fuse adjacent to power lead socket – spare fuse provided.

Please contact us on +44 (0) 1952 290 321 if you need to return the battery charger unit.

11. PIN BRAZING BATTERIES

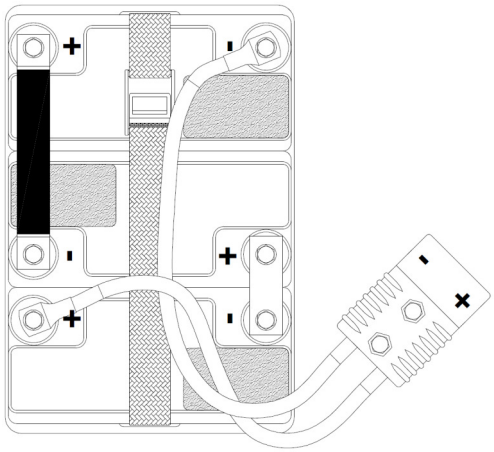


Figure 12

Battery packs supplied with the pin brazing unit are 3 individual 12V DC batteries wired in series for a 36V DC supply.

These battery packs are required to be kept on constant trickle charge to maintain their efficiency. If the batteries are left in storage, uncharged for a prolonged period of approximately 3 months or more then, it is possible that the batteries may deteriorate to an unusable condition.

We recommend that batteries for spares are purchased as a 36V Quickchange re-chargeable battery pack" Part # 273 199 5640 (figure 12) in order to facilitate constant trickle charging with the pin brazing battery charger, Part # 273 199 5020.

Regularly check that the bus bars connecting the 3 batteries in series and cable connections to the connector are tight. Loose terminals could result in defective and/or swollen batteries.

11.1 QUICKCHANGE RE-CHARGEABLE BATTERY PACK

The battery pack is accessible by undoing the safety latch on the side of the enclosure and opening the lid on top of the power control unit. Unplug the connector by grasping the red plugs at either end, and pulling directly apart (do not grasp the cables to pull the connector apart). Lift out the pack using the retaining strap, insert a fully charged pack, reconnect the red connector fully and then re-secure the lid.

Assuming that the battery pack being inserted is fully charged, the blue LED should illuminate on the front panel of the power control unit when the cables are properly reconnected.

Only attempt to re-charge battery packs with the recommended charging unit in conjunction with the charge adaptor supplied with your spare pack (273 199 5620). Or alternatively it can be re-inserted into the Easybond MkII enclosure for re-charging.

NO SPARKS, SMOKING OR NAKED FLAMES NEAR THE BATTERIES AS EXPLOSIVE GASES MAY BE EMITTED.

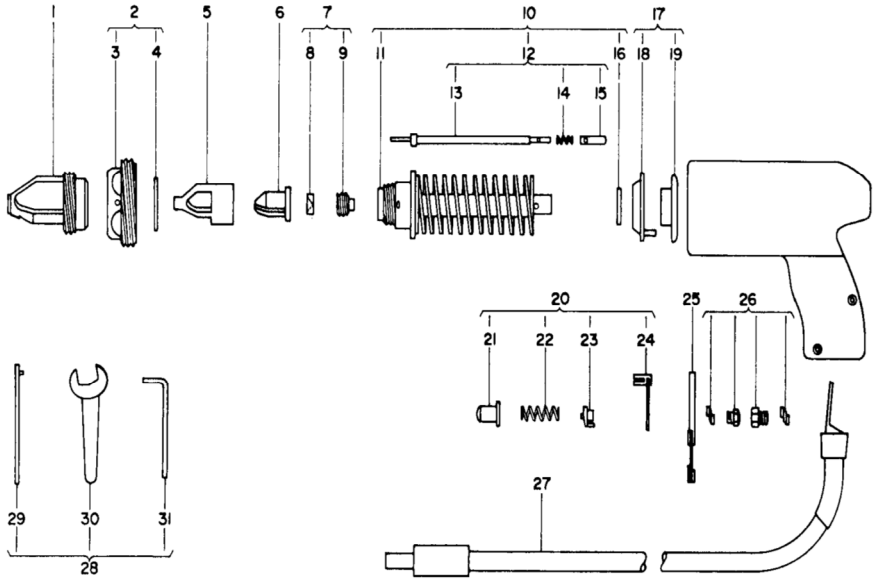
12. STANDARD PIN BRAZING GUN MAINTENANCE MANUAL

This manual covers standard pin brazing gun part number 273 199 0780

Servicing, maintenance and repair should always be carried out by fully trained personnel in conjunction with this manual. Should difficulties persist then the complete unit should be sent directly back to BAC Corrosion Control Limited for examination and/or repair.

12.1 PARTS

Parts that are damaged or defective in any way should be replaced. Experience has shown that it is uneconomical to replace single parts. The package system is designed to replace complete sets of parts to ensure effective repair and reliable operation.



The numbers in brackets in the text refer to the figure below.

Figure 13

Item No	Part No	Description
	273 199 0780	Standard brazing gun BB1/ Easybond MKII
1	270 074 8150	Ferrule holder for 8mm direct brazing pins
	273 100 0560	Ferrule holder for M8 threaded brazing pins
	273 100 1240	Ferrule holder for M10/M12 threaded brazing pins
2	273 190 0560	Front piece complete with locking ring
4	270 074 8160	Locking ring
5	270 071 5600	Pin holder for 8mm direct brazing pins
	273 100 0550	Pin holder for M8 threaded brazing pins
	273 100 3870	Pin holder for M10 threaded brazing pins
	273 100 1230	Pin holder for M12 threaded brazing pins
6	270 071 5610	Spark shield

Item No	Part No	Description
7	273 190 0570	Contact nipple and washer (5 pack)
10	273 074 8220	Centre piece complete
12	273 190 0580	Ejector rod complete
16	270 071 5340	Remanence washer
17	273 190 0590	Conductor ring and insulating ring
20	273 190 0600	Trigger assembly
25	270 071 5700	Contact arm
26	273 190 0110	Contact set complete
27	273 190 1310	Cable 35mm sq. 1.7m long
28	273 190 0610	Tool kit

12.2 ROUTINE MAINTENANCE

12.2.1 SERVICE SCHEDULE

(numbers in brackets are from Figure 13)

Daily

1. Check the cable (27) to the battery unit is undamaged.
2. Check that the pin and ferrule holders are undamaged and hold the brazing pin and ferrule centrally and securely.

Weekly

1. Check and clean the contacts (26) using emery cloth.

12.2.2 REPLACEMENT OF THE CONTACT SET

Figure 14 Sequence (numbers in brackets are from Figure 13)

Dismantling the contact set (26) – Figure 14

Open the gun handle plate using the provided allen key (31) to remove screws.

1. Unscrew the flat contact with the spanner (30) and remove the gun cable (27), ensure the spring washer is removed.

2. Unscrew the domed contact and remove from the contact arm (25), ensure the spring washer is removed.

Re-assembly

1. Screw the domed contact into the spring bracket (23). Ensure that the spring washer is located correctly in the groove in the contact before tightening.
   Do not over tighten the contacts.

2. Place the flat contact through the hole in the gun cable lug (27) and offer both up to the location. Use the screwdriver between both contacts to assist with tightening.
   Do not over tighten the contacts. Replace gun handle plate and screws.

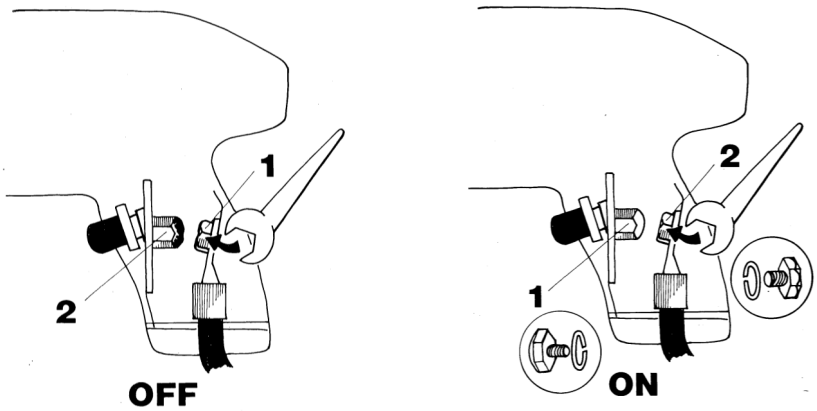


Figure 14

12.2.3 REPLACEMENT OF CONTACT NIPPLE AND CERAMIC WASHER (7)

This section can also be used for the removal/replacement of ferrule holder (1), pin holder (5) and plastic spark shield (6)

Figure 15 Sequence (numbers in brackets are from Figure 13):

1. Unscrew by hand the ferrule holder (1).

2. Place allen key (31) in the hole of the front piece silver locking ring (2) and the hole in the front centre piece (10) (turn pin holder if necessary). This will lock in place the centre piece to allow removal of the pin holder (5).

3. Unscrew by the pin holder (5).

4. Remove plastic spark shield (6).

5. Remove ceramic washer (8).

6. Using the peg spanner (29) remove and replace the new contact nipple (9). The nipple should be a tight fit and screwed down fully. The nipple should be flush or no more than 0.2mm below the front face. Replace the ceramic washer at the same time (8).

When re-installing the plastic spark shield (6) ensure that the three indentations are correctly seated onto the three legs of the pin holder (5).

Reassemble using reverse procedure and removing allen key before replacing the ferrule holder by hand, lightly grease the thread on the to avoid cross threading. .

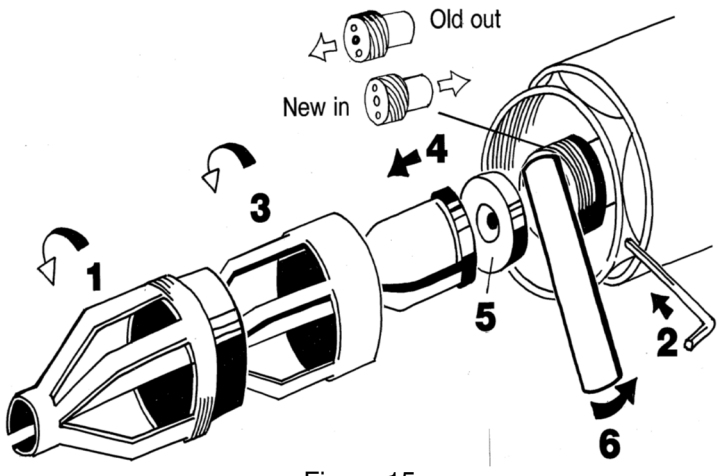


Figure 15

12.3 TROUBLESHOOTING

Contact arm moves over when centrepiece is depressed without pressure on the trigger.

1. Worn or damaged leaf spring. Replace contact arm (25)
2. Defective trigger spring (22). Replace spring.

Contacts remain closed after pressure is released from centrepiece.

1. Misaligned contact arm (25). Check position of tufnol strip relative to slot in upper part of handle.
2. Check contact arm is engaged correctly with moving plastic part in gun barrel.
3. Top contact arm retaining screw too long. Check and replace.

13. WEEE

Do not dispose of this product as unsorted municipal waste.
Contact BAC Corrosion Control Ltd (BAC) or a qualified recycler for disposal.

The European Union also adopted Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), with requirements that went into effect August 13, 2005. WEEE is intended to reduce the disposal of waste from electrical and electronic equipment by establishing guidelines for prevention, reuse, recycling and recovery.
BAC has already modified its practices and processes to conform to the requirements in this important Directive.

CE

The Easybond equipment has been tested to, and is in compliance with the following standards:
BSEN 61000-6-4:2007 + A:2011 Generic emissions standard for industrial equipment
BSEN 61000-6-2:2005 Generic immunity standard for industrial equipment

14. INSPECTION AND ACCEPTANCE OF PIN BRAZING EQUIPMENT (GOODS)

The Customer will notify in writing (otherwise that on a delivery document) (a) BAC Corrosion Control Ltd and any carrier of any claim regarding the quantity or condition of Goods delivered or any damage to them within 5 days of delivery and (b) BAC Corrosion Control Ltd of any claim regarding any defect which should be apparent on reasonable inspection within 15 days of delivery, time being of the essence. The Warranty will apply to any such defect or damage. If no such notice is given, so far as concerns those matters the Customer will be deemed to have accepted the Goods and that they conform with the Contract.

15. WARRANTY

1. The following warranty will apply to the pin brazing equipment (Goods):

The pin brazing equipment (excluding pin brazing batteries) will correspond with their specification and description and sample (if any) at the time of delivery and if within twelve (12) calendar months of the Goods being delivered by the Company or, as the case may be, completion of the supply of any services (or such other period as BAC Corrosion Control Ltd may agree in writing) any defect in the Goods is discovered under normal use which is directly attributable to the Goods not so corresponding or faulty design, materials or workmanship, or a valid claim is made under paragraph 7, BAC Corrosion Control Ltd will at its option and expense remedy the defect or damage by replacement or repair or refund the purchase price of the defective or damaged Goods.

2 The warranty will be subject to the following conditions:

(a) it will not apply to any defect or damage resulting from any:-

(i) alteration of the Goods without BAC Corrosion Control Ltd.'s prior written consent, incorrect installation (except by BAC Corrosion Control Ltd), incorrect storage,

using non BAC consumables and components, overloading, normal wear and tear, misuse or use not for their intended purpose, accident, abnormal conditions of use or maintenance, repair or use which is not in accordance with BAC Corrosion Control Ltd.'s or manufacturer's instructions or procedures issued from time to time; or

(ii) any act or omission of the Customer or any third party (excluding BAC Corrosion Control Ltd.'s agents or sub-contractors involved in the supply of the Goods) or any fault in any other goods.

(b) BAC Corrosion Control Ltd will not be liable for any defect in the Goods arising from any document information or materials supplied by or for the Customer.

(c) Warranty work will be carried out during BAC Corrosion Control Ltd.'s normal business hours so far as is practicable at BAC Corrosion Control Ltd.'s premises and/or elsewhere at its option. The customer will procure that BAC Corrosion Control Ltd.'s personnel will have such access to the Goods as they may require to investigate alleged defects or damage and carry out any warranty work.

(d) Goods must be returned carriage paid to BAC Corrosion Control Ltd.'s trading premises as required by BAC Corrosion Control Ltd. Repaired or replacement Goods will be delivered to the Customer's premises within the United Kingdom or, in the case of exports, FOB UK port or airport at the cost and discretion of BAC Corrosion Control Ltd. BAC Corrosion Control Ltd will reimburse the Customer the reasonable carriage costs incurred by it in returning by road from the customer's premises in Great Britain or by other agreed mode of transport Goods which are repaired or replaced under the warranty or whose purchase price is refunded. Replaced Goods will belong to BAC Corrosion Control Ltd.

(e) The customer must give to BAC Corrosion Control Ltd in writing full particulars of any alleged defect or damage within the period stated in paragraph 7 or, in the case of a warranty claim, within 7 days after it becomes aware of the same and in any event within 7 days of the end of the warranty period (time being of the essence).

(f) No sum shall be due and unpaid under the Contract when BAC Corrosion Control Ltd is to fulfil its obligations under the warranty.

(g) If the Customer makes any claim falling outside the terms of the warranty the Company may charge for examining the goods and any work done or goods supplied by it in respect of that claim at its then prevailing rates and any cost or expense incurred by the Company.

15.1 WARRANTY FOR PIN BRAZING BATTERIES

Due to the nature of batteries we supply a 3 month warranty from date of delivery and in accordance with the terms set out in section 15.

The warranty excludes deterioration and damage due to incorrect storage, prolonged period without charging, loose connections of battery pack and mishandling.

NOTES

PART NUMBERS FOR EASYBOND MKII PARTS

Description	Part #	Weight
Easybond MKII System Complete	**273 199 5660**	**31.9 kg**
1. Easybond MKII power control unit *	273 199 5610	21.0 kg
2. Standard gun *	273 199 0780	3.5 kg
3. Earth device *	273 199 1360	1.1 kg
4. BAC Pin brazing battery charger *	273 199 5020	3.0 kg
5. AttachécCase *	273 190 4680	3.3 kg
6. Tool kit *	273 190 0610	0.3 kg
7. Manuals on CD *	278 900 1900	
Easybond MKII Power Control Unit	**273 199 5610**	**21.0 kg**
Battery kit (3 x battery and web) **	273 199 5630	15.3 kg
Pin brazing enclosure **	273 199 5690	5.7 kg
Re-chargable battery pack	**273 199 5640**	**15.8 kg**
Battery kit (3 x battery and web) ***	273 199 5630	15.3 kg
Charge adaptor ***	273 199 5620	0.5 kg
Optional accessories		
Grinder with 18V battery	273 199 0685	5.8 kg
Grinding burr	273 190 1370	0.04 kg
In car battery charger VEPAC	273 199 5040	1.5 kg
Extension cable 2.5m	273 190 1460	1.3 kg
Portable trolley	273 100 4825	6.5 kg

* Included when purchasing part number 273 199 5660.
** Included when purchasing part number 273 199 5610.
*** Included when purchasing part number 273 199 5640.

PACKING DIMENSIONS

Power control unit: 380mm x 320mm x 420mm

Attaché case: 540mm x 320mm x 160mm

Battery charger: 230mm x 200mm x 120mm

18V grinder case: 470mm x 310mm x 170mm

BAC Pin Brazing equipment and consumables are manufacture within the EU (excluding batteries)

BAC Corrosion Control Limted.
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