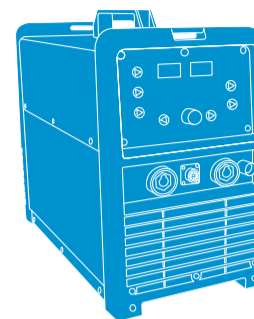


HSS Hire

200 amp TIG/MMA Inverter

Provides excellent welding performance across a broad range of applications



Code 55332

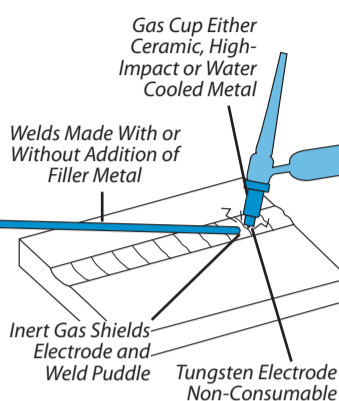
the electrode a quick twist back over the weld to detach it. After the arc is struck, your **next concern is to maintain it, and this requires moving the electrode tip towards the molten pool at the same rate as it is melting away. At the same time, the electrode has to move along the plate to form a bead.** The electrode is directed at the weld pool at about 20° from the vertical. The rate of travel has to be adjusted so that a well-formed bead is produced.

If the travel is too fast, the bead will be narrow and strung out and may even be broken up into individual globules. If the travel is too slow, the weld metal piles up and the bead will be too large.

TIG WELDING

Gas Tungsten Arc Welding (GTAW) or TIG (Tungsten Inert Gas) as it is commonly referred to, is a welding process in which fusion is produced by an electric arc that is established between a single tungsten (non-consumable) electrode and the work piece. Shielding is obtained from a welding grade shielding gas or welding grade shielding gas mixture which is generally Argon based. A filler metal may also be added manually in some circumstances depending on the welding application.

TIG Welding is generally regarded as a specialised process that requires operator competency. While many of the principles outlined in the previous Arc Welding section are applicable a comprehensive outline of the TIG Welding process is outside the scope of this Operating Manual. For further information please contact HSS Hire for advice.



TECHNICAL SPECIFICATIONS

Mains Input Voltage	230V±15% 50/60Hz
Welding Current Range (STICK)	10-170A
Welding Current Range (TIG)	10 - 200A
Range Number of Phases	Single Phase
Maximum Input Current (STICK, TIG)	34.9A, 32,4A
Effective Input Current (STICK, TIG)	15.5A, 14.1A
Weight	22kg
Dimensions H x W x D (assembled)	400 x 240 x 475mm
Open circuit voltage	70.3V DC / 50 VAC

EQUIPMENT CARE

Never push the equipment beyond its design limits. If it will not do what you want with reasonable ease and speed, assume you have the wrong equipment for the job. Contact HSS Hire for advice.

GENERAL SAFETY

For advice on the safety and suitability of this equipment contact HSS Hire.

There is a serious risk of personal injury if you do not follow all instructions laid down in this guide.

The hirer has a responsibility to ensure that all necessary risk assessments have been completed prior to the use of this equipment.

Most welding tasks may be considered as hot work in site situations and may be subject to specific permits to work.

This equipment should only be used by an operator who has been deemed competent to do so by his/her employer.

This equipment should be used by a competent adult who has read and understood these instructions. Anyone with either a temporary or permanent disability, should seek expert advice before using it.

Keep children, animals and bystanders away from the work area. Cordon off a NO GO area using cones and either barriers or tape, available for hire from HSS Hire.

Welding screens are also available for hire from your local HSS Hire.

WARNING

IF YOU ARE WEARING AN ELECTRONIC LIFE SUPPORT DEVICE (A HEART PACEMAKER) YOU MUST CONSULT YOUR DOCTOR BEFORE GOING NEAR OR WORKING WITH THIS EQUIPMENT. MAGNETIC FIELDS ASSOCIATED WITH HIGH CURRENTS MAY AFFECT THESE DEVICES.

Never use this equipment if you are ill, feeling tired, or under the influence of alcohol or drugs.

Cover your skin. Wear practical, dry, hole-free insulating gloves, protective clothing and footwear. Avoid loose garments and jewellery that could catch in moving parts, tie back long hair.

Insulate yourself from work and ground using dry insulating mats or covers.

Ensure the work area is well lit and ventilated, a fume extractor or smoke eliminator should be used. If in doubt, ask about lighting and ventilation equipment at HSS Hire.

Do not work near flammable gases or liquids, petrol or paint thinner fumes for example. **Keep combustible materials at a safe distance** - at least 5m.

Watch for fire, and keep a fire extinguisher nearby.

This equipment generates potentially harmful noise levels. To comply with health and safety at work regulations, **ear defenders must be worn** by everyone in the vicinity.

A head shield with suitable shading MUST be worn by anyone in the work area – goggles are not suitable. Avoid loose garments and jewellery that could interfere with the work.

If the headshield or lens becomes damaged, return it to HSS Hire.

Fumes produced by the welding process, if inhaled, can be harmful to health. A suitable mask must be

Keep the equipment clean - you will find this less of a chore if you clean it regularly, rather than wait until the end of the hire period.

When not in use, store the equipment somewhere clean, dry and secure.

FINISHING OFF

Switch OFF and unplug the unit. Leave everything to cool then take the earth clamp off the work.

Where applicable remove the welding rod, disconnect all leads and coil them up neatly.

Collect all parts together and give them a final clean up ready for return, to HSS Hire.



... have you been trained

The law requires that personnel using this type of equipment in the workplace must be competent and qualified to do so.

Training is available at HSS Training
0845 766 7799

...any comments?

If you have any suggestions to enable us to improve the information within this guide please e-mail your comments or write to the Safety Guide Manager at the address below
e-mail: safety@hss.com

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Group Office: 25 Willow Lane, Mitcham, Surrey CR4 4TS

Web Site: <http://www.hss.com>

worn when using this equipment. **Respiratory protective equipment is available for hire,** contact HSS Hire for details.

Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapours to form highly toxic and irritating gases.

Do not weld on coated metals, such as galvanized lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

Never use welding equipment near computers or any sensitive electronic equipment. Observe potential electromagnetic problems in the surrounding area.

Make sure you know how to switch this machine OFF before you switch it ON in case you get into difficulty.

If working **above floor level, wear a safety harness** to prevent falling.

Always switch equipment OFF before making any adjustments to it. Never leave it switched ON and unattended.

Keep the power unit's air vents clear of all obstructions.

LET IT COOL

HANDLE WELDING EQUIPMENT AND WORK WITH CARE – IT WILL BE HOT. LEAVE EQUIPMENT TO COOL BEFORE CHANGING WELDING RODS, MOVING EARTH CLAMPS, AND SO ON.

Always transport, store and operate the machine in an upright position.

Never dip electrode holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode. Do not wrap cables around your body.

Always ground the workpiece to a good electrical (earth) ground.

Do not touch electrode while in contact with the work (ground) circuit.

Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.

VEHICLE SAFETY

BEFORE CARRYING OUT WELDING WORK ON CARS/LORRIES AND SIMILAR VEHICLES...

REMOVE THE VEHICLE'S BATTERY AND DISCONNECT THE ALTERNATOR.

REMOVE ALL COMBUSTIBLE MATERIAL AND OTHER FIRE/EXPLOSION HAZARDS.

Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service.

Do not touch live electrical parts.

Check the condition of the equipment before use.

If it shows signs of damage or excessive wear, return it to HSS Hire.

COSHH information sheets are available from HSS Hire.

GAS CYLINDERS

IF WORKING WITH GAS CYLINDERS HANDLE THEM WITH CARE. IF DAMAGED, A CYLINDER CAN EXPLODE.

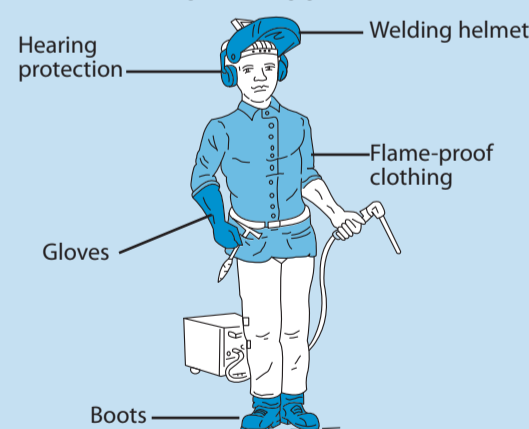
PROTECT COMPRESSED GAS CYLINDERS FROM EXCESSIVE HEAT, MECHANICAL SHOCKS, AND ARCS.

INSTALL AND SECURE CYLINDERS IN AN UPRIGHT POSITION BY CHAINING THEM TO A STATIONARY SUPPORT OR EQUIPMENT CYLINDER RACK TO PREVENT FALLING OR TIPPING.

KEEP CYLINDERS AWAY FROM ANY WELDING OR OTHER ELECTRICAL CIRCUITS.

NEVER TOUCH ANY CYLINDER WITH AN ELECTRODE.

SAFETY OUTFIT



ELECTRICAL SAFETY

The HSS 200 amp TIG/MMA Inverter unit must be powered from a 240V 16amp mains supply, **all mains connections must only be made by a qualified Electrician.**

Extension leads must always be protected by armoured cable.

Keep flexes and leads out of harm's way. Never run them through water, over sharp edges, or where they could trip someone.

If the tool fails, or if its flex or plug (if fitted) gets damaged, return it. Never try to repair it yourself.

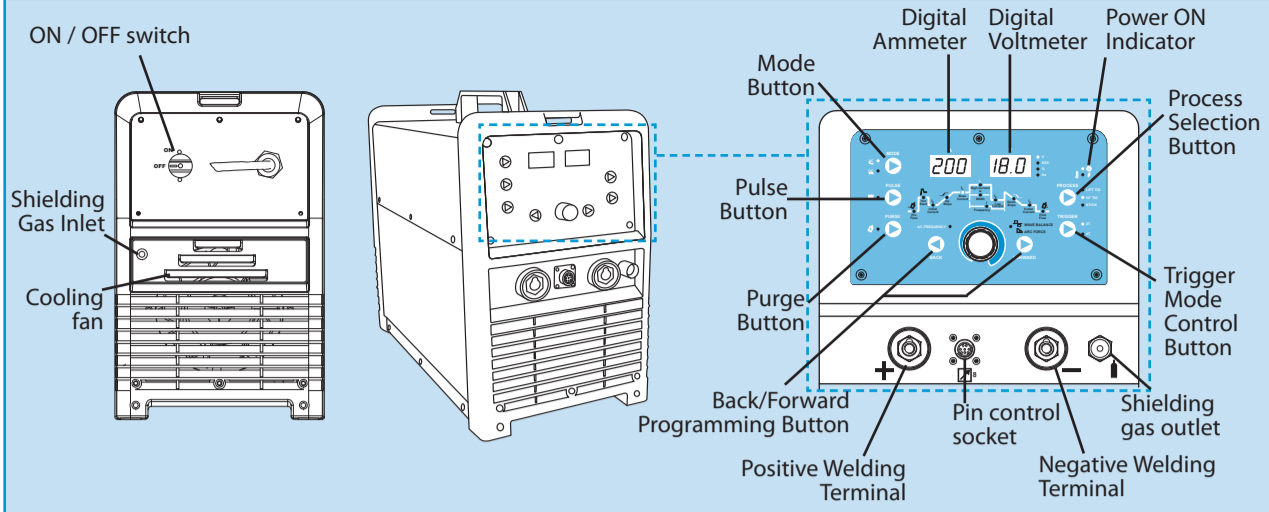
Do not use electrical equipment in very damp or wet conditions, it can be dangerous.

WARNING

TOUCHING LIVE ELECTRICAL PARTS CAN CAUSE FATAL SHOCKS OR SEVERE BURNS. THE ELECTRODE AND WORK CIRCUIT IS ELECTRICALLY LIVE WHENEVER THE OUTPUT IS ON. THE INPUT POWER CIRCUIT AND MACHINE INTERNAL CIRCUITS ARE ALSO LIVE WHEN POWER IS ON.

The ON/OFF switch (rear panel) is the main circuit breaker. The Power Indicator display illuminates when the power switch is in the ON position.

IDENTIFIER



GETTING STARTED

The HSS 200amp TIG/MMA Inverter is a single phase constant current welding inverter capable of performing MMA (Stick), GTAW (HF TIG) and GTAW (Lift TIG) welding processes. The unit provides excellent welding performance across a broad range of applications when used with the correct welding consumables and

WARNING

WELDING PRODUCTS AND WELDING PROCESSES CAN CAUSE SERIOUS INJURY OR DEATH, OR DAMAGE TO OTHER EQUIPMENT OR PROPERTY, IF THE OPERATOR DOES NOT STRICTLY OBSERVE ALL SAFETY RULES AND TAKE PRECAUTIONARY ACTIONS.

procedures.

Never use this inverter until you have fully read and understood this User Guide and the machine has been properly set up using the information it contains.

STICK DUTY CYCLE		TIG DUTY CYCLE	
170A	15%	200A	20%
100A	60%	116A	60%
80A	100%	90A	100%

It is important that the equipment duty cycle is taken into consideration when in use.

TRANSPORTING METHODS

This unit is equipped with a handle for carrying purposes. Lift unit with handles built into the top of the front and rear moulded panels.

Use handcart or similar device of adequate capacity.

If using a fork lift vehicle, place and secure unit on a proper skid before transporting.

65 ●PERCENT (%) **Wave Balance** parameter operates in AC TIG mode and is used to set the penetration to cleaning action ratio for the AC weld current. Generally WAVE BALANCE is set to 50% for AC STICK welding. The WAVE BALANCE control changes the ratio of penetration to cleaning action of the AC TIG welding arc. Maximum weld penetration is achieved when the WAVE BALANCE control is set to 10%. Maximum cleaning of heavily oxidised aluminium or magnesium alloys is achieved when the WAVE BALANCE control is set to 65%.

WAVE BALANCE is used for aluminium welding in AC HF TIG or AC LIFT TIG mode. It is used to set the ratio of penetration to cleaning action for the AC TIG welding arc.

Maximum weld penetration is achieved when the WAVE BALANCE is set to 10%. Maximum cleaning of heavily oxidised aluminium or magnesium alloys is achieved when the WAVE BALANCE is set to 65%.

PREPARING FOR WORK

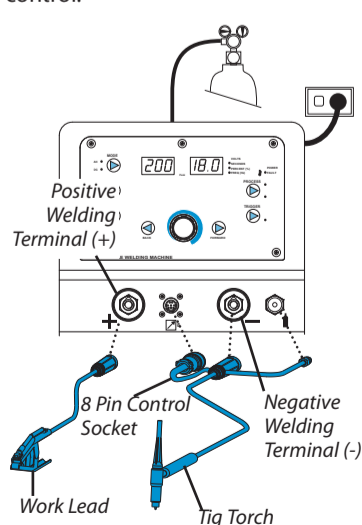
Place the unit on the **stable, levelled ground at a distance of 300mm or more from the walls or similar that could restrict natural air flow for cooling. Make sure the area is free from moisture, dust, oil, steam and corrosive gases. It is important to operate the machine in ambient temperature between 0°C and 40°C.**

DANGER!

ALWAYS MAKE SURE THE MAINS POWER SUPPLY IS SWITCHED OFF BEFORE UNDERTAKING ANY TYPE OF INTERVENTION ON THE WELDER

TIG (GTAW) WELDING

Select Lift TIG or HF TIG mode with the process selection control.



Connect the TIG Torch to the negative welding terminal (-) and the work lead to the positive welding terminal (+).

Connect the TIG torch trigger switch via the 8 pin socket located on the front of the power source. The TIG torch will require a trigger switch to operate in Lift TIG or HF TIG Mode.

Fit the welding grade shielding gas regulator / flowmeter to the shielding gas cylinder then connect the shielding gas hose from the regulator / flowmeter outlet gas

INLET on the rear of the unit. Connect the gas hose from the TIG torch to the gas OUTLET on the front of the unit.

PROGRAMMING MODES

You can choose between 2 working modes **MMA (Stick) and GTAW (Tig)**.

To select **Stick Programming Mode** press the PROCESS button to select STICK mode. Then press the MODE switch to toggle between AC and DC welding output. When AC is selected the frequency is fixed at 50Hz. The Programming LED's are always active. Press FORWARD or BACK to cycle through available programming functions.

Use the Multi Function Control to adjust the Parameter selected. While welding the Multi Function Control directly controls the base current.

70 Amps **Hot Start** parameter operates in all weld modes except LIFT TIG mode and is used to heat up the weld zone in TIG modes or improve the start characteristics for stick electrodes the peak start current on top of the BASE (WELD) current (e.g. HOT START current = 130 amps when BASE (WELD) = 100 amps & HOT START = 30 amps.)

170 Amps **Base Current** parameter sets the TIG WELD current when PULSE is OFF. This parameter also sets the STICK weld current.

100 ●PERCENT (%) **Arc Force** is effective when in Manual Arc Mode only. Arc Force control provides and adjustable amount of Arc Force (or "dig") control. This feature can be particularly beneficial in providing the operator the ability to compensate for variability in joint fit-up in certain situations with particular electrodes. In general increasing the Arc Force control toward 100% (maximum Arc Force) allows greater penetration control to be achieved.

When the machine is used with a Remote Foot Control, disconnect the foot control to allow max current to be previewed / adjusted, then re connect foot control, max current that has been pre set will be output when foot control is fully depressed during welding. The maximum current can also be adjusted in welding operation when foot control is fully depressed. To avoid premature arcing, please ensure the TIG Torch is located away from your work piece.

GAS CYLINDERS

SECURE THE WELDING GRADE SHIELDING GAS CYLINDER IN AN UPRIGHT POSITION BY CHAINING IT TO A SUITABLE STATIONARY SUPPORT TO PREVENT FALLING OR TIPPING.

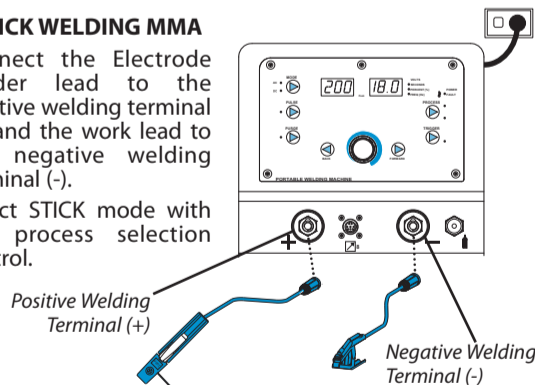
DANGER!

BEFORE CONNECTING THE WORK CLAMP TO THE WORK MAKE SURE THE MAINS POWER SUPPLY IS SWITCHED OFF.

STICK WELDING MMA

Connect the Electrode Holder lead to the positive welding terminal (+) and the work lead to the negative welding terminal (-).

Select STICK mode with the process selection control.



DANGER!

BEFORE CONNECTING THE WORK CLAMP TO THE WORK AND INSERTING THE ELECTRODE IN THE ELECTRODE HOLDER MAKE SURE THE MAINS POWER SUPPLY IS SWITCHED OFF.

ATTENTION

IF IN DOUBT, WHEN CONNECTING THE WORK LEAD CONTACT HSS HIRE FOR ADVICE
WELDING CURRENT FLOWS FROM THE POWER SOURCE VIA HEAVY DUTY BAYONET TYPE TERMINALS. IT IS ESSENTIAL, HOWEVER, THAT THE MALE PLUG IS INSERTED AND TURNED SECURELY TO ACHIEVE A SOUND ELECTRICAL CONNECTION.

CAUTION

LOOSE WELDING TERMINAL CONNECTIONS CAN CAUSE OVERHEATING AND RESULT IN THE MALE PLUG BEING FUSED IN THE BAYONET TERMINAL.

To select **LIFT TIG and HF TIG Programming Mode** press the PROCESS button to select LIFT TIG or HF TIG mode. Press the MODE switch to toggle between AC and DC welding output. The Programming LED's are always active. Press FORWARD or BACK to cycle through available programming functions. Use the Multi Function Control Knob to adjust the parameter selected.

10 ●SECONDS **Pre-Flow** parameter operates in TIG modes only and is used to provide gas to the weld zone prior to striking the arc, once the torch trigger switch has been pressed. This control is used to dramatically reduce weld porosity at the start of a weld.

200 Amps **Initial Current** parameter operates in (4T) TIG modes only and is used to set the start current for TIG. The Start Current remains on until the torch trigger switch is released after it has been depressed. Note: The maximum initial current available will be limited to the set value of the base current.

150 ●SECONDS **Up Slope** parameter operates in (4T) TIG modes only and is used to set the time for the weld current to ramp up, after the torch trigger switch has been pressed then released, from Initial Current to High or BASE current.

200 Amps **Base Current** parameter sets the TIG WELD current when PULSE is OFF. This parameter also sets the STICK weld current.

200 Amps **High Current** parameter sets the High weld current when in PULSE mode.

200 Amps **Low Current** -The lowest point in the pulse is called the Low Current.

80 ●PERCENT (%) **Pulse Width** parameter sets the percentage on time of the PULSE FREQUENCY for High weld current when the PULSE is ON.

200 ●Hz **Pulse Frequency** parameter sets the PULSE FREQUENCY when the PULSE is ON.

250 ●SECONDS **Down Slope** parameter operates in TIG modes only and is used to set the time for the weld current to ramp down, after the torch trigger switch has been pressed, to crater current. This control is used to eliminate the crater that can form at the completion of a weld.

200 Amps **Crater Current** parameter operates in (4T) TIG modes only and is used to set the finish current for TIG. The CRATER Current remains ON until the torch trigger switch is released after it has been depressed.

Note: The maximum crater current available will be limited to the set value of the base current.

600 ●SECONDS **Post Flow** parameter operates in TIG modes only and is used to adjust the post gas flow time once the arc has extinguished. This control is used to dramatically reduce oxidation of the tungsten electrode.

150 ●Hz **AC Frequency** parameter operates in AC TIG mode only and is used to set the frequency for the AC weld current.

BASIC TECHNIQUES

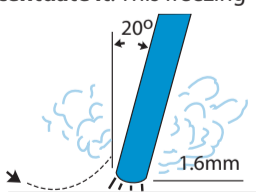
STICK WELDING

If you haven't done any welding, the simplest way to commence is to run beads on a piece of scrap plate. Use mild steel plate about 6.0mm thick and a 3.2mm electrode. **Clean any paint, loose scale or grease off the plate and set it firmly on the work bench** so that welding can be carried out in the downhand position. **Make sure that the work clamp is making good electrical contact with the work**, either directly or through the work table. **For light gauge material, always clamp the work lead directly to the job**, otherwise a poor circuit will probably result.

Place yourself in a comfortable position before beginning to weld. Get a seat of suitable height and do as much work as possible sitting down. Don't hold your body tense. A taut attitude of mind and a tensed body will soon make you feel tired. Relax and you will find that the job becomes much easier. You can add much to your peace of mind by wearing a leather apron and gauntlets. You won't be worrying then about being burnt or sparks setting alight to your clothes.

Place the work so that the direction of welding is across, rather than to or from, your body. **The electrode holder lead should be clear of any obstruction** so that you can move your arm freely along as the electrode burns down. If the lead is slung over your shoulder, it allows greater freedom of movement and takes a lot of weight off your hand. **Be sure the insulation on your cable and electrode holder is not faulty**, otherwise you are risking an electric shock.

Practice this on a piece of scrap plate before going on to more exacting work. You may at first **experience difficulty due to the tip of the electrode "sticking"** to the work piece. This is caused by making too heavy a contact with the work and failing to withdraw the electrode quickly enough. **A low amperage will accentuate it.** This freezing-on of the tip may be overcome by scratching the electrode along the plate surface in the same way as a match is struck. As soon as the arc is established, **maintain a 1.6mm to 3.2mm gap between the burning electrode end and the parent metal. Draw the electrode slowly along as it melts down.**



Another difficulty you may meet is the tendency, after the arc is struck, to withdraw the electrode so far that the arc is broken again. A little practice will soon remedy both of these faults.

The securing of an arc length necessary to produce a neat weld soon becomes almost automatic. You will find that a long arc produces more heat. A very long arc produces a crackling or spluttering noise and the weld metal comes across in large, irregular blobs. The weld bead is flattened and spatter increases. A short arc is essential if a high quality weld is to be obtained although if it is too short there is the danger of it being blanketed by slag and the electrode tip being solidified in. If this should happen, give