Gator Automatic Butt Fusion Range
Operating Manual

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Contents

1 Safety instructions

These operating instructions must be followed to ensure safe operation of the Gator automatic butt fusion machine and operators must be fully conversant with the safety instructions.

Fusion Group Limited can offer basic training and regular maintenance where required.

Only use undamaged equipment that has been properly maintained and calibrated. Refer to section 5 maintenance and care of this operating manual for further information.

1.1 Precautions when lifting

Where necessary, operators are advised to request for assistance when carrying, moving or lifting this equipment.

1.2 Risk of fire or explosion

Do not use this equipment in combustible gaseous environments.

1.3 Risk of electrical shock

This equipment must be connected to a suitable electrical earth supply.

Depending upon the model, this equipment requires a power supply of 100V, 110V or 220V AC. Avoid walking or standing on cables and ensure that cables are safely routed.

For safety purposes, this machine has been fitted with overload protection and a residual current device (RCBO).

Always take care where you see the electrical warning labels displayed. Only authorised engineers must attempt to open electrical enclosures.

1.4 Risk of burning.

The process of Butt Fusion Welding uses a heater plate that typically runs at temperatures in excess of 200ºC. The use of heat resistant gloves is strongly recommended, as is use of suitable eye protection.

1.5 Precautions specific to Automatic Butt Fusion Machines

This unit is automated and as such, uses moving linkages during its operation that will move without operator intervention. Care must be exercised during automated trim, check and jointing cycles. An audible alarm will be heard, as a warning, prior to and during automated movements.

It is the responsibility of the control unit operator to ensure that all personnel are clear of the equipment before activating the control for the automated cycle.

In the event of an emergency situation activate the emergency stop button that is fitted to every machine and cuts all the power to the control system. The button may be found at the top of the control box enclosure.

If necessary, the chassis clamps may be opened or closed using the silver coloured open/close buttons.

1.5.1 Trimmer module

The trimming cycle is automatically controlled from the control unit. Operators must ensure that all personnel are clear of the equipment and should exercise due care and attention, when operating the equipment.

When manual handling of the trimmer is carried out, care must be taken to eliminate the risk of injury from the cutting blades.

The trimmer module is fitted with a safety device that will prevent operation when the unit is not positioned within the chassis.

Following the trim cycle, it is essential that the trimmer is removed before attempting to remove swarf from the trimmed pipe ends.

Care should be taken when adjusting or replacing trimmer blades.

1.5.2 Heater module

At the end of the heating cycle, the heater plate is automatically ejected. To eliminate the risk of injury, the operator should ensure that all personnel are clear of the heater at this time.

If the emergency stop button is actuated during the heating cycle, when the emergency stop button is reset the heater plate can be ejected by pressing the silver open chassis button.

High temperatures are required to fuse polyethylene; therefore, operators are reminded to take care when handling the heater. The use of heat resistant gloves is strongly recommended.

1.5.3 Guidance when using hydraulic fluids

To avoid the possibility of skin disorders, repeated, or prolonged contact with lubricants and industrial oils must be avoided.

Eyes: Irrigate immediately with copious quantities of water for several minutes.

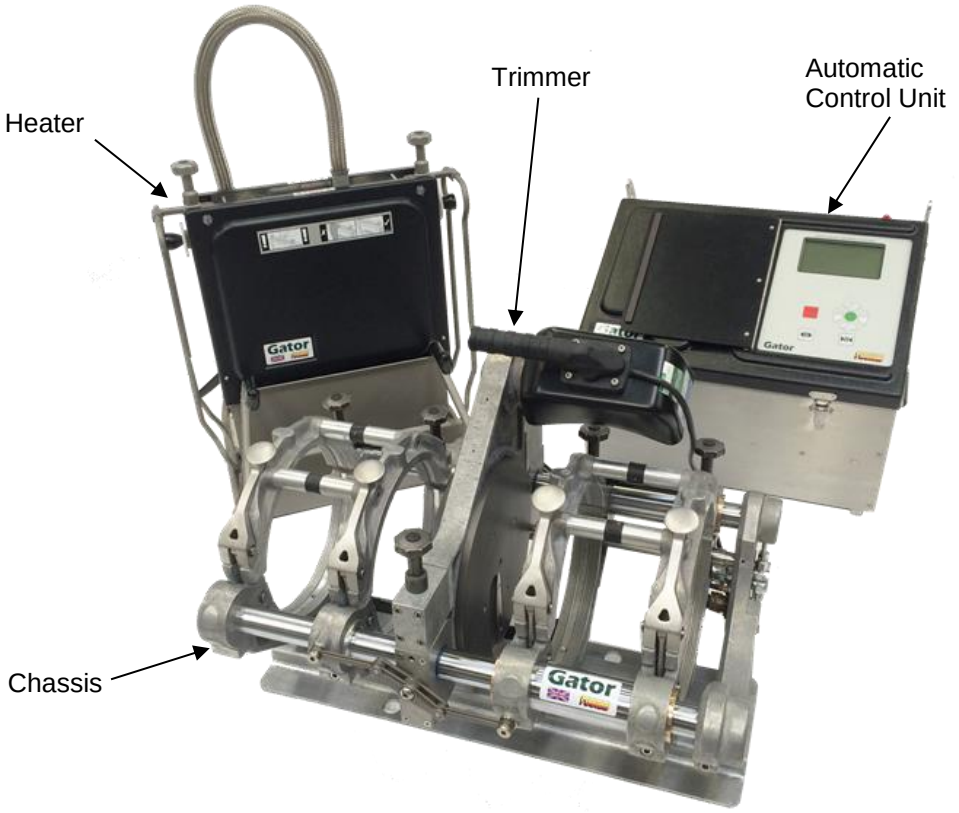
Skin: Wash thoroughly with soap and water as soon as possible. Infrequent, or short term contact requires no immediate action

Ingestion: Send patient to hospital, or obtain medical attention immediately. DO NOT induce vomiting.

Aspiration: If aspiration occurs, or is suspected, send the patient to hospital, or obtain medical attention immediately.

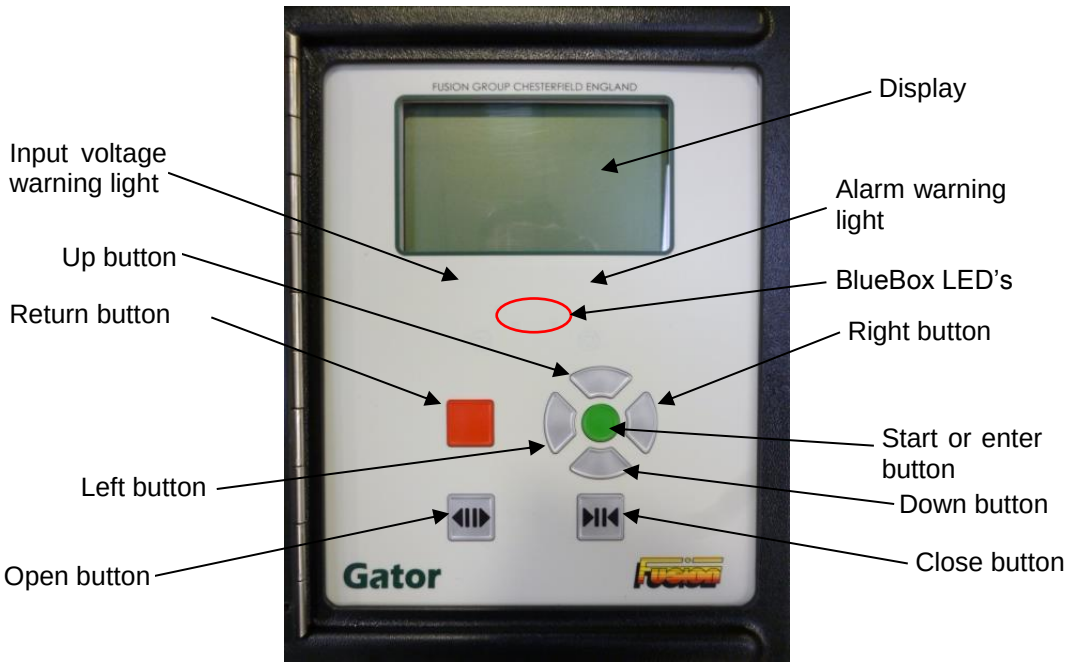
2 Getting to know your Gator

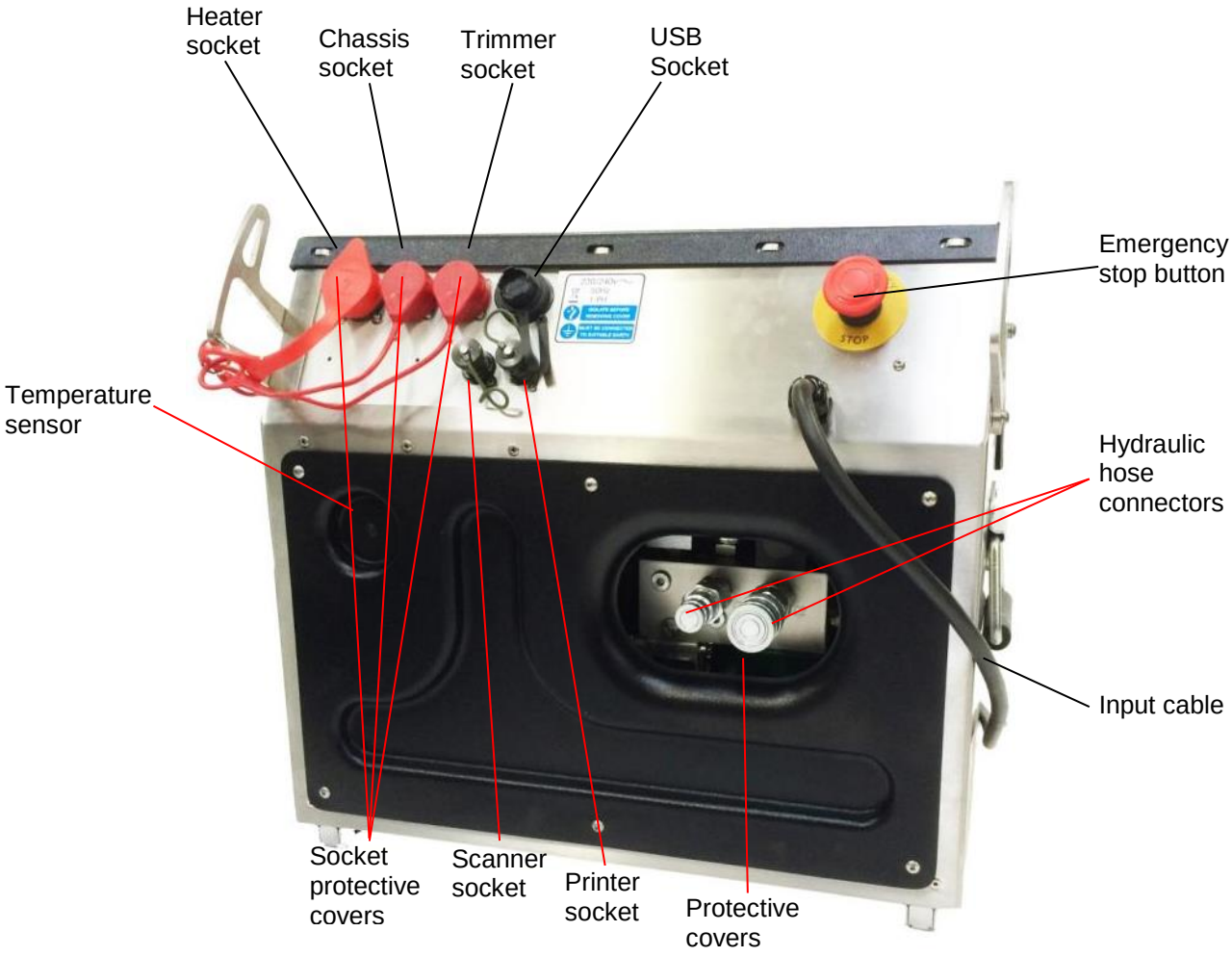
The four main components of the Automatic Butt Fusion Machine:



2.1 Controller

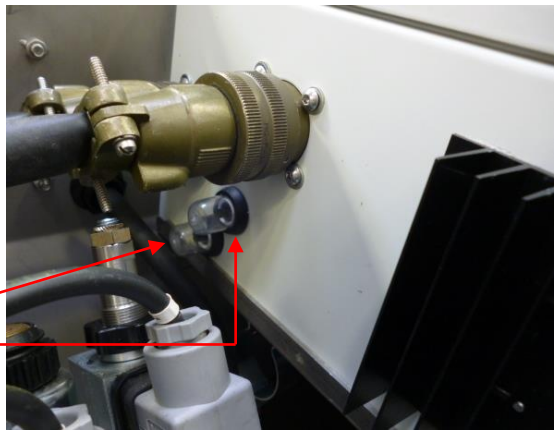
The controller keypad is located under the protective cover of the control unit lid.





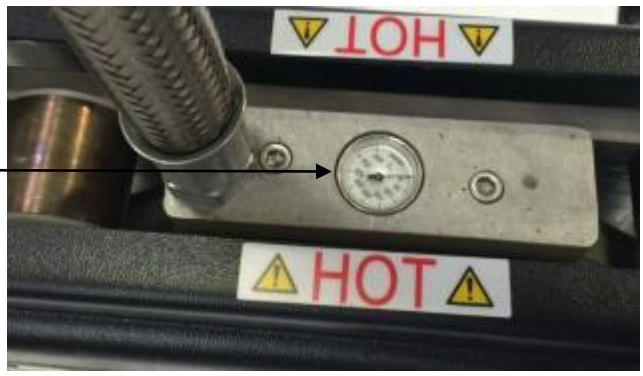
2.1.1 Inside the control unit

Two clips secure the protective cover to the main body of the control unit enclosure. Unclip the cover and remove to gain access.



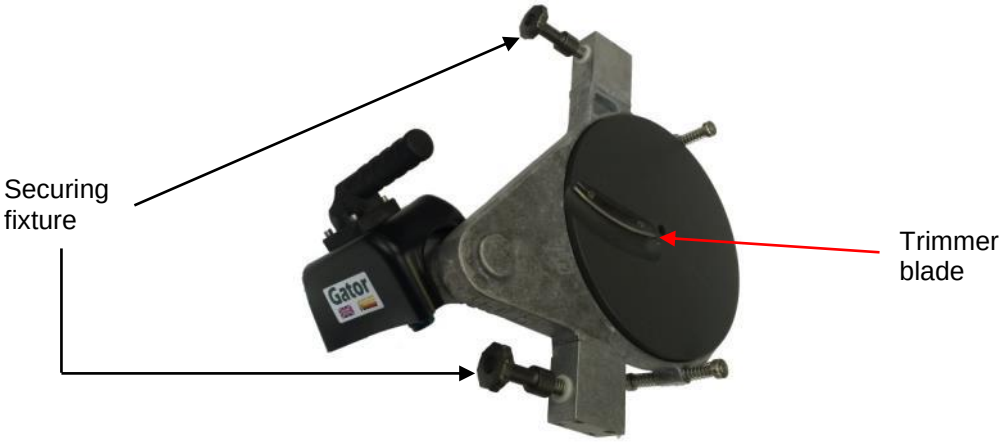
There are sensitive electronic components located within the electronic control enclosure. Do not attempt to open this enclosure – there are no user serviceable parts inside.

2.2 Heater

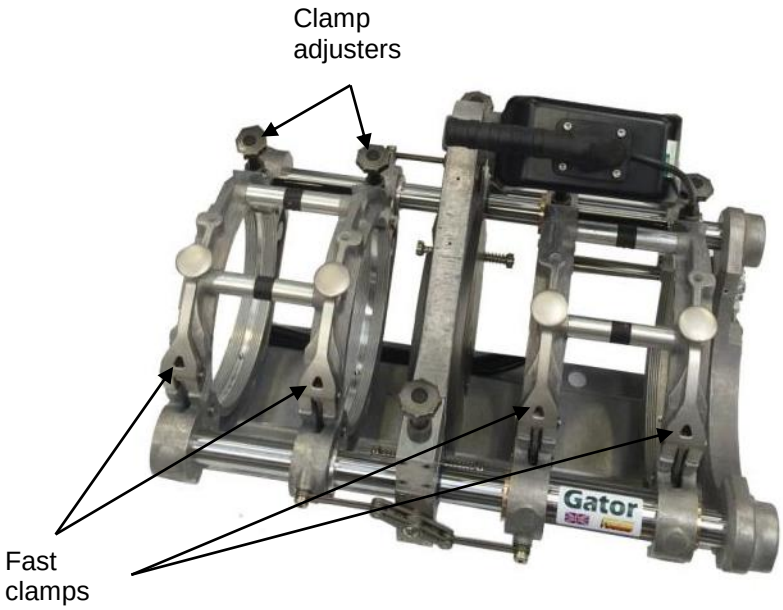


Temperature Indicator

2.3 Trimmer



2.4 Chassis



3 Scope of Operation

This equipment is designed specifically for the purpose of butt fusion jointing of polyethylene pipes and should not be utilised for any other operation.

4 Maintenance and Care

4.1 User maintenance

Prior to connecting the unit to a supply always:

- Ensure that the all lead and hydraulic hose connectors are clean and free of damage.
- Visually inspect the controller, trimmer, heater and chassis for signs of damage.
- Ensure that the mains input plug is not damaged and remove any dirt.
- Check there is no damage to the input, trimmer, chassis and heater cables such as torn insulation or deep gouges.
- Check there is no damage to the hydraulic hoses such as deep gouges or leaks.
- Check the hydraulic oil level top up with approved hydraulic oil, refer to section 4.1.1 Oil check.
- Ensure that the Barcode Reader is connected (Do not connect after the supply is turned on as the box or the scanner could be damaged).
- Ensure that the unit has been appropriately maintained and calibrated.

Never use the control unit if plug, leads or enclosure are damaged, the service agent or Fusion Group Limited must carry out maintenance and service.

Do not attempt to open the enclosures - there are no user serviceable parts inside.

4.1.1 Oil check

Check the oil level prior to powering up.

Approved hydraulic Oils

If the hydraulic oil level is low, use only Fusion approved hydraulic oils with Gator machines:

Castrol	Hy-Spin AWS22	Total	Azolla AZ22	ESSO	NUTO H22
BP	Energol HLP22	Texaco	Rando HD22	Mobil	DTE 22
Derwent	22	Shell	TELLUS 22	Duckhams	Zircon 3

4.2 Storage Guidance

It is recommended that when not in use, the equipment should be stored in a clean dry area. Metallic containers are not recommended, as they are prone to causing severe condensation that may affect sensitive electronic components.

4.3 Transportation Guidance

Lifting heavy equipment – before attempting to lift any equipment, please ensure that it can be safely lifted without assistance. Where necessary, assistance should be sought before carrying, moving or lifting this equipment. In particular, if the equipment cannot be easily manually lifted, mechanical assistance should be used.

When transporting the equipment, care should be taken to secure all units to avoid unnecessary damage. Heater units should be secured on the heater stand provided to give additional support.

4.4 Servicing

To ensure safe operation and performance are maintained, this product should be checked at intervals of no longer than 6 months, either by the manufacturer or an authorised service agent.

For technical information contact the manufacturer; Fusion Group Limited, via telephone on +44(0) 1246 268666.

5 Good practice for Automatic Butt Fusion

5.1 Good practice during Butt Fusion

- ✓ In cold temperatures the chassis should be opened and closed manually approx. 10 times in quick succession following the automatic warm up routine.
- ✓ Always ensure that the equipment is calibrated and properly maintained.
- ✓ Always weld inside a shelter on a suitable baseboard or ground sheet.
- ✓ Where possible, site the equipment on clear level ground.
- ✓ Always ensure pipes are aligned correctly and supported on pipe rollers to minimise drag.
- ✓ Cover open pipe ends to eliminate wind chill to the heater and joint interface.
- ✓ Clean pipe surfaces (inside and out), pipe ends and clamps before inserting pipe into the machine.
- ✓ Position pipes into the clamps with the pipe marking uppermost and aligned.
- ✓ Wash the heater plate when cold before every welding session and perform dummy welds when hot to remove fine particles from the heater surface. On pipe sizes above 180mm, two dummy welds should be made at the start of each session.
- ✓ Perform dummy welds after changing from one pipe size to another, also if the heater plate has been allowed to cool.
- ✓ Clean trimmer discs and blades before use.
- ✓ Ensure that when trimming, a continuous ribbon of material, of complete pipe wall thickness is produced from both pipe ends before stopping the trimmer and advancing to the feathering operation.
- ✓ Always wait for the trimmer to stop rotating before removing it from the machine.
- ✓ Replace the trimmer in the stand provided.
- ✓ Remove shavings from pipe ends and chassis.
- ✓ Check visually that both pipe ends are completely trimmed.
- ✓ Always check pipes for alignment ensuring no gaps exist between the two pipe ends around the entire circumference of the abutted pipes.
- ✓ On completion of satisfactory alignment checks, proceed with the welding cycle without delay.
- ✓ Number/code the joint and bead using an indelible marker.
- ✓ After FULL cooling time has elapsed, remove either external or internal bead and carry out quality checks.

5.2 Poor practice during Butt Fusion

- ✘ Do not attempt to open the computer enclosure – there are no user serviceable parts inside.
- ✘ Do not use damaged equipment.
- ✘ Do not attempt to weld pipes of different material, diameter or SDR.
- ✘ Do not leave shavings inside pipe or on the chassis.
- ✘ Do not introduce dirt onto trimmed pipe ends whilst removing swarf.
- ✘ Do not touch trimmed pipe or fitting ends.
- ✘ Do not remove pipes from the machine before the complete cooling time has elapsed.
- ✘ Do not cut corners in any part of the welding cycle.
- ✘ Do not attempt to install pipe until fully cooled.

6 Preparation

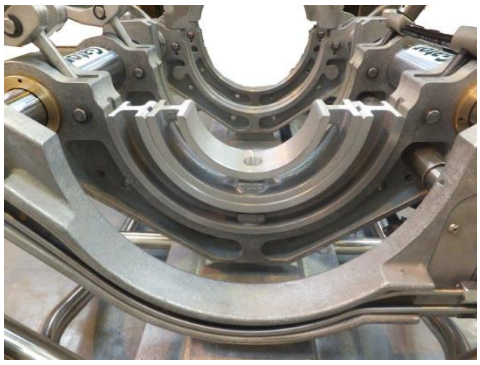
6.1 Familiarisation with Equipment

Before applying power to the machine, operators should be familiar with all aspects of machine control and have read and understood this Operating Manual.

Before commencing a jointing cycle, operators should ensure that the generator used has sufficient fuel to complete operations.

6.2 Clamp Liners

Liner sets are invariably supplied with Gator machines. Liners are used to clamp pipes of diameter smaller than the nominal machine size. For example, a Gator250 may be supplied with a liner set 250x180 to accommodate 180mm diameter pipe. The liners may also be nested so that for 125mm pipe, 250x180 and 180x125 liners may be stacked together to form 125mm clamps.



Each liner set will be supplied with appropriate fixing screws that and should be secured to both top and bottom clamps. Allen keys are supplied to facilitate fixing. Please ensure that the correct length fixings are used otherwise, the machine may not function correctly.

6.3 Connections

Connections to the control unit are located on the rear of the control enclosure. Electrical plugs and sockets are both sturdy and waterproof. However, care should be taken to ensure that the connections are always clean, dry and free from damage. Protective sheathes are provided for the sockets when the corresponding plug is disconnected.

Hydraulic connections for the chassis should be free from contaminants before inserting the respective hydraulic hose. The connections may be disconnected by pulling back the knurled outer cover of the hose fitting.

- Connect the heater to the socket on the control unit.
- Connect the chassis flying lead to the socket on the control unit.
- Connect the trimmer unit to the socket on the control unit.
- Connect the control unit supply lead to the power supply. Prior to connection ensure that the electrical supply is earthed and suitably rated for that quoted on the machines rating plate. The individual component power requirements are listed in section 16 Specification of this Manual.
- Open the cover and test the function of the RCBO device.
- Switch the machine on using the trip switch of the RCBO. Make sure that the Emergency Stop button is not activated.
- Wipe clean the hydraulic connectors on the hoses and the control unit. Connect the hoses to the Auto Controller.

7 Manual data entry

Manual data entry is required at various points in the operation of the unit.

7.1 Data entry

There are two modes for character entry - Select mode and Edit mode. On activating Manual Data Entry the box is in Select mode.

Select mode – Characters/Actions are selected using the up, down, left and right buttons to move the Select cursor to the required icon. The selected character/action is accepted by pressing the green button.

Edit mode – To select Edit mode move the Select cursor to ❖ and press the green button, the Select cursor goes off (indicating Edit mode). The Edit cursor can then be moved within the edit string by using the left and right buttons. To insert a character, exit Edit mode (by pressing the green button, the Select cursor will re-appear over the ❖ icon) and select the required character as normal.

Edit Cursor - If the Edit cursor cannot be seen the edit position is to the right of the last character in the entry field.

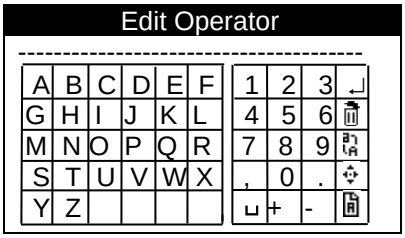
Select Cursor – If the Select cursor cannot be seen the box is in Edit Mode.

Insert Characters - Characters will always be inserted to the left of the Edit cursor until the entry field is full. The Edit cursor will move to the right as characters are inserted.

Delete Characters - Characters to the left of the Edit cursor can be deleted at any time by pressing the red button. The Edit cursor will move to the left as each character is deleted (until the Edit cursor is at the left most position).

Extended Character - On certain fonts and characters, if the green button is held down for at least three seconds, the extended characters will be shown. Once the extended character pop-up is displayed, selection is carried out as described in Select Mode. NOTE: if the pop-up has been displayed and the extended character is not required, pressing the red button will exit the pop-up without adding the extended character. See appendix A.

Restricted Entry Fields – If the entry field requires specific characters, selection is restricted to those characters.



↵ - Accept text and exit (Action)

🗑 - Delete the text string (Action)

🗑 - Select Edit Mode (Action)

🗎 - Change font being used (Action)

⇳ - Switch between upper and lower case characters. (Action)

␣ - Space character.

8 Status bar

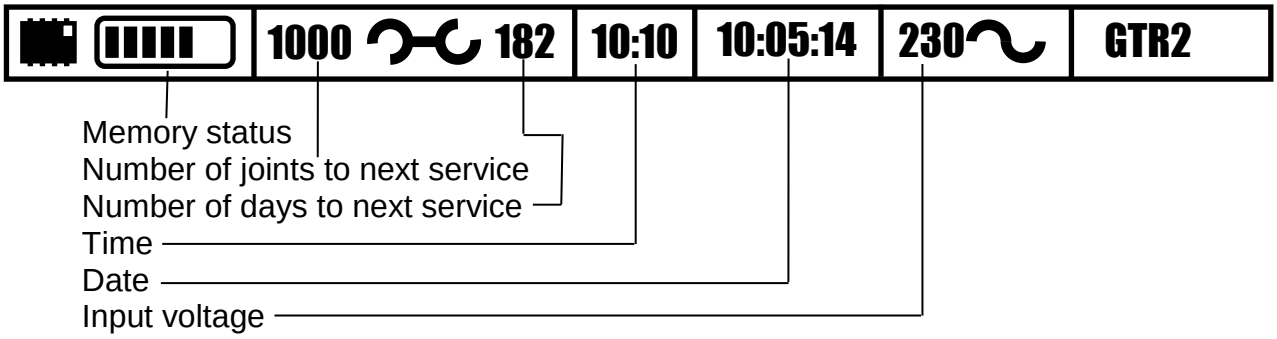
The status bar is shown at the bottom of most of the screens showing information on the service period and input supply.

Each bar on the memory status indicates approximately 80 joint records.

The spanner between the number of joints and the days to next service will flash, when either the number of joints or the days to next service are less than 21.

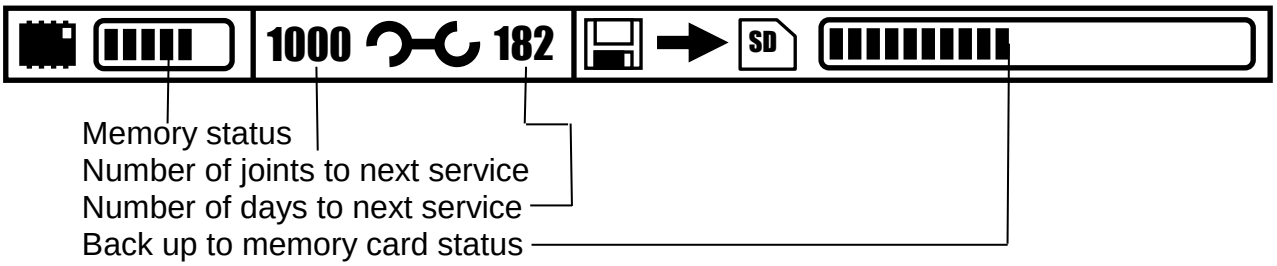
8.1 Standard status bar

This status bar is shown when in information entry, fitting information and fusing screens.



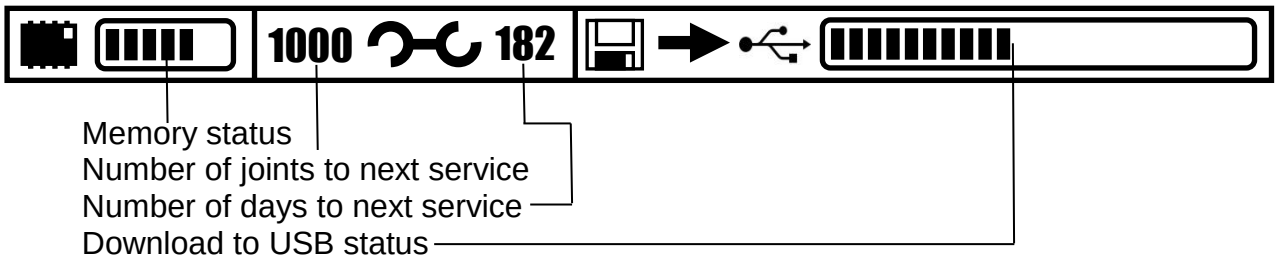
8.2 Backing up record to memory card

This status bar is shown when backing up to memory card when joint is complete.



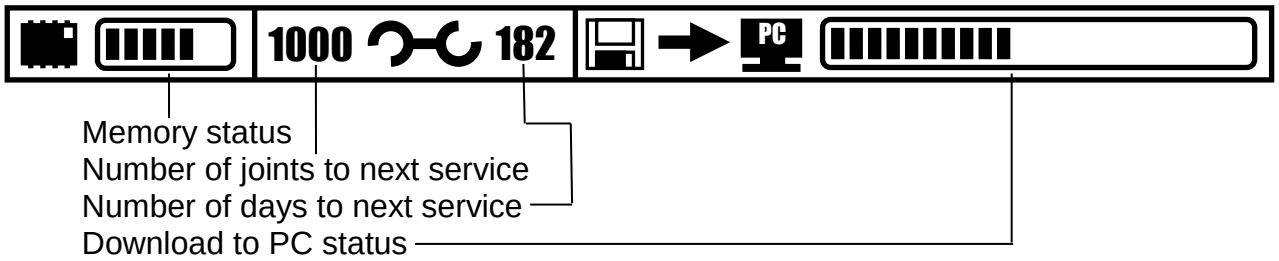
8.3 Sending data to USB memory device

This status bar is shown when sending data to USB memory device (in review joint record(s), print joint record(s) and fast data transfer modes).



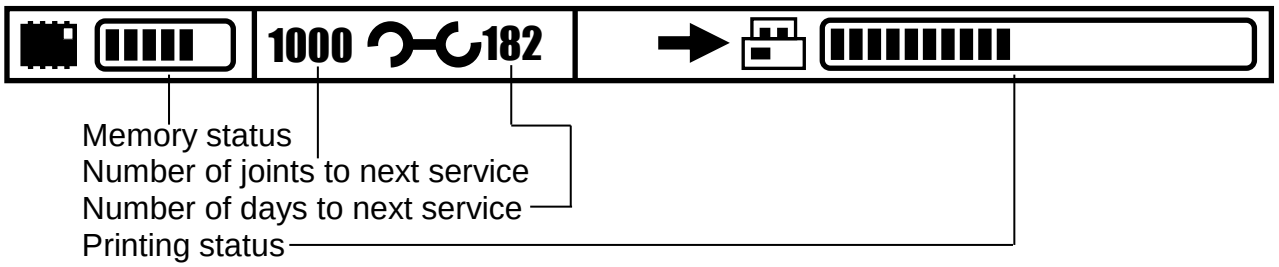
8.4 Sending data to PC

This status bar is shown when sending data to PC (in review joint record(s), print joint record(s) and fast data transfer modes).



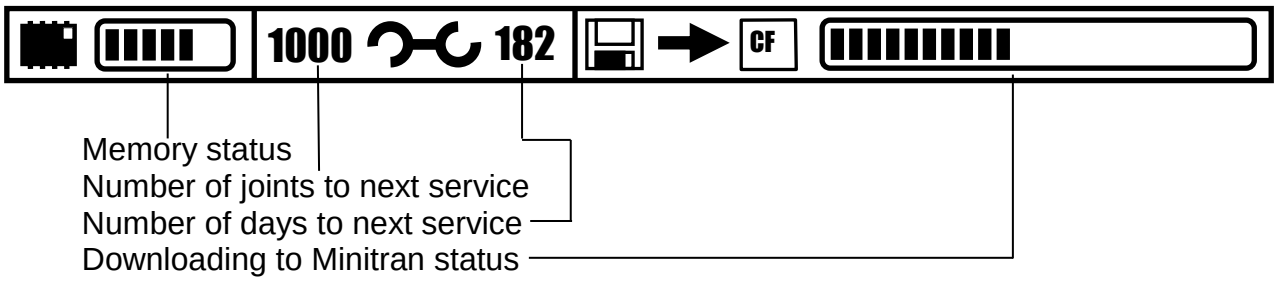
8.5 Printing joint record

This status bar is shown when sending data to printer (in review joint record(s) and print joint record(s) modes).



8.6 Sending data to Minitran

This status bar is shown when sending data to Minitran (in fast data transfer mode).

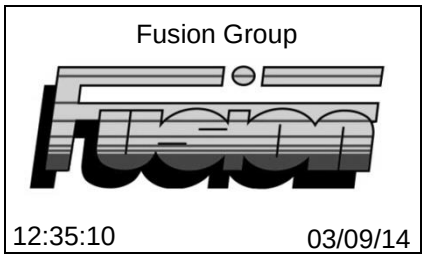


9.0 Machine operation

9.1 Power-up sequence

Once the equipment is connected as described in Section 6.3, connect the machine to a suitable power supply and switch on.

When the system is switched on, the LCD (Liquid Crystal Display) indicates the following message for approximately 4 seconds and a short audible tone will sound.



This display indicates the current time, date and if configured, the owner details.

If ISO12176-3 login method have been enabled the unit will be inoperable until a valid operator barcode is scanned. The screen will either prompt for a valid operator barcode, when a valid operator barcode is scanned to the unit before the information entry screen will be displayed. If the red button is pressed the user menu will be displayed see section 13 user menu.

9.2 BlueBox

If BlueBox has been enabled then a mobile device must be connected to the unit via Bluetooth with the BlueBox application open, before the information entry screen is displayed. Refer to mobile device operating instruction for connecting via Bluetooth. For further details contact Control Point on +44 (0)1246 262422 or email info@controlpointllp.com.

9.3 Service alarm

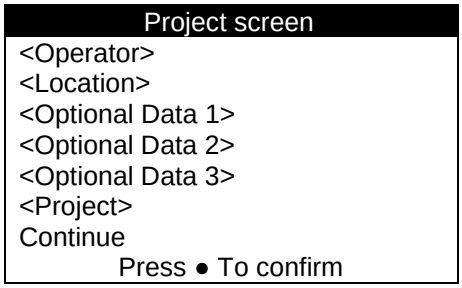
This indicates that either, the number of joints made or the number of days since the last service has been exceeded. The unit is in need of a service and contact should be made with nearest service centre.

If Service Lockout has been disabled - press the green button to carry on using the box. Service required will be recorded on the joint data until the unit is serviced and the service period been reset.

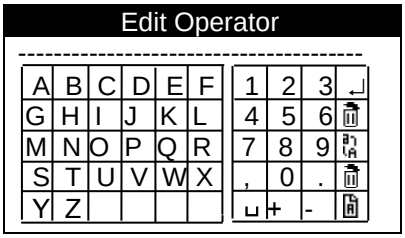
If Service Lockout has been enabled - the unit is inoperable until it has been serviced and the service period has been reset.

10 Information entry

The unit will prompt for entry of operator, location, optional data 1, optional data 2, optional data 3 and project - if enabled - as follows:



Scroll onto the field required by using the up and down buttons on the keypad. When the appropriate field is highlighted, either press the left or right buttons to select one of the last five entries for the particular field or press the green button to enter the edit screen. On pressing the green button the following screen will be displayed.



Scroll to the appropriate character using the up, down, left and right buttons on the keypad. Then press the green button on the keypad to select the character. Repeat this until the required information is entered. Then select '↵' press the green button on the keypad to return to information entry screen. For more information see section 7.1 character entry screen.

After entering project the edit project joint number screen will be displayed. If a previous project has been selected then the next project joint number will be displayed on edit project joint number screen. The project joint number can be made up of letters and numbers. The box will increment the number but not the letters. Any letters AFTER the number will be lost for the following joint.

If ISO12176-3 operator login method entry is enabled and a valid operator barcode has been scanned then the operator information will be displayed.

Note: that the operator, location, optional data 1, optional data 2, optional data 3 project and project joint number information is retained for subsequent joints. If any of operator, location, optional data 1, optional data 2, optional data 3 and project are not required then leave them empty or enter a 'space' character.

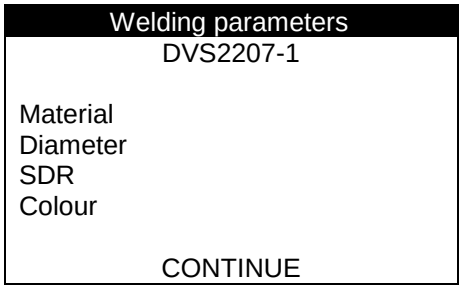
Up to 5 previously entered items of data are maintained for re-use. This 'History' data can be accessed by pressing the left or right scroll buttons.

When all the relevant information has been entered scroll down to 'Continue' then press the green button to proceed to the fitting information screen.

11 Jointing process

11.1 Pipe selection

After traceability information has been entered or bypassed, the screen will display the jointing screen to allow the operator to change details relating to the pipe joint. Please note that the jointing details previously selected will be stored within this screen.

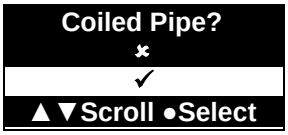


In order to ensure that the correct welding parameters are used for the jointing process, the operator must select the correct parameters as detailed below.

The operator may accept the pipe parameters and proceed to the next stage by pressing the green button.

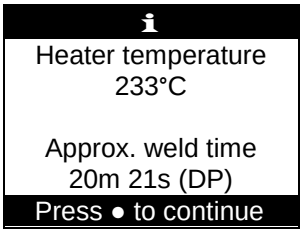
Should the pipe or welding specification be incorrect, use the up and down buttons to highlight the parameter to change then press the green button and select the correct parameter.

If the standard selected is WIS4-32-08 or GIS/PL2-3 (GB) a pop up screen is displayed allowing the operator to select either straight or coiled pipe.



Always ensure that the pipe selected matches the pipe to be welded and that the selected welding standard is in accordance with the requirements of governing authority for that installation.

Once the pipe parameters have been confirmed the following pop up window will appear.



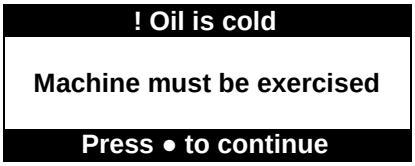
11.2 Automated trim Cycle

In accordance with safety regulations, a warning light and audible alarm are operated before and during all automatic cycle movements.

In certain parts of the cycle, pressing the red button will allow the operator to step the cycle back to the previous operation.

11.2.1 Oil Warm-up

All models feature an oil warm-up sequence that is activated when the ambient temperature is below 0ºC. When active a pop up window will be displayed:



Press the green button to operate the automatic oil warm-up sequence as prompted. The hydraulic pump will operate for one minute and can be bypassed by pressing the green button during the sequence.

11.2.2 Standard trim routine

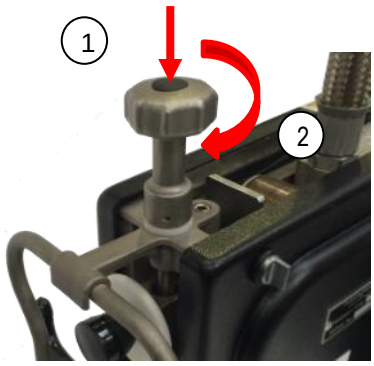
All models feature a facility to automatically position the machine to a pre-set position, ready for the trimming cycle.

The display will indicate:

Note that the top line of the display indicates the current joint number, the actual and target heater temperature (indicated here with ✓ to signify that the heater has reached the target temperature). The bottom line shows the selected pipe type. At this point the machine can be manually opened and closed using the open and close buttons (Refer to Section 2.1).

11.2.3 Fit Trimmer

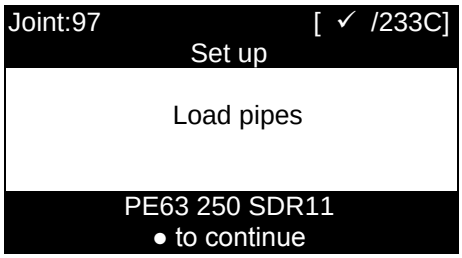
Remove the trimmer from the heater/trimmer stand and position onto the locator block between the two centre clamps. Location pegs will allow the trimmer to sit flush onto the blocks.



To avoid contact with the fast clamp levers, note that the trimmer must be placed with the motor positioned over the clamp adjusters.

To secure the trimmer into the machine, push down on each securing fixture (1) and then rotate the fixture by twisting clockwise through 90º (2). Note that this procedure will also be used to secure the heater to the locator blocks.

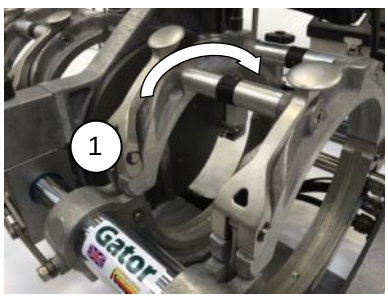
When the machine detects that the trimmer is in position, a beep will sound once, confirming correct fitting and the display will change to:

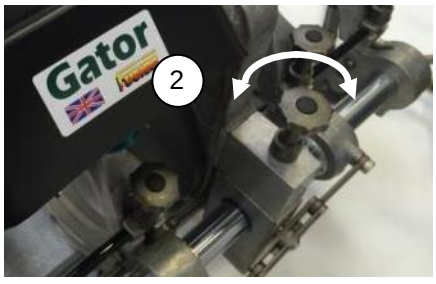


11.2.4 Pipe loading

Release the toggle levers from the top clamps and lift each clamp to unhook from the clamp adjusters on the opposite side. Remove the top clamps and ensure that the correct liners are fitted to all of the clamps (Refer to Section 6.2).

If the auto trim set-up function has been used, feed the pipe ends into the machine until each pipe end is in contact with the trimmer disc. If the auto trim set-up function has not been used, the pipe should be positioned slightly away from the trimmer disc. Note that the shortest pipe should always be fixed to the moving end of the machine. It is good practice to ensure that the pipe details printed along





the two pipes are aligned and placed to the top of the machine.

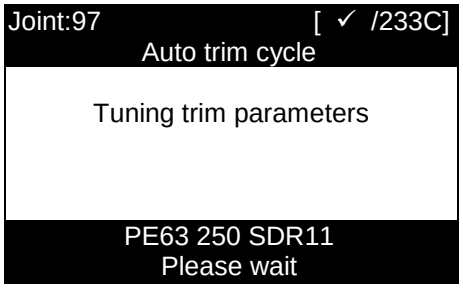
To secure the pipe, place the clamp over the pipe and raise the edge to ensure that the clamp adjusters are hooked under, onto the clamp. The clamp should then be firmly pushed onto the pipe and the fast-clamp toggle levers (1) placed over the edge of the clamp it may be necessary to release the clamp adjusters (2) – particularly on oval pipe. When fastening the pipe into the machine, the toggle levers should be set so that only a reasonable force needs to be applied to fasten the toggle lock.

As a guide when fastening, the fast clamp levers should be lifted in the direction indicated and the clamp adjusters moved until the lever is in a vertical position – the levers may then be pushed onto the top clamp. Note that the adjusters should only be moved when the fast-clamp levers are in the released position.

11.2.5 Trim Cycle

When the pipes have been secured in place, press the green button and the machine will start the trimmer motor. The LCD will display:

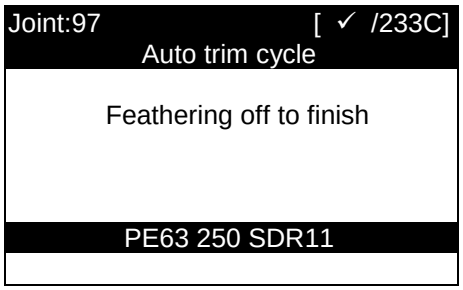
The machine will open and then tune the trimming parameters for around 5 seconds indicating:



The software control monitors the trimmer and if certain parameters are found to be excessive, the machine will indicate that the machine requires service. This warning will remain visible for approximately 10 seconds or until the green button is pressed.

When the trimming parameters have been tuned, the display will indicate:

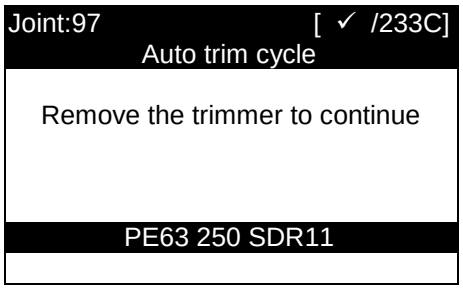
The system will then gradually increase the system pressure to move the pipes onto the trimmer in a controlled manner. When a small amount of pipe has been trimmed from the pipe ends, the display will indicate:



When the green button is actuated, the LCD display will indicate “feathering off to finish” while the pipe ends are being finely “feathered”, to avoid a step on the pipe end.

The motor will stop and the display will indicate that the trim cycle is complete.

The machine will open and the prompt:



Unlock the trimmer by turning the twist locks anti-clockwise. Remove the trimmer and carefully replace it into the heater/trimmer stand. As the trimmer is removed, a short audible tone will be heard. The machine is now ready for the pipe slippage and alignment check stage.

Once the trimmer has been removed, clear all swarf away from the pipe ends. It is good practise to remove the swarf from the bottom of the chassis to avoid dragging contaminants over the trimmed pipe ends.

When the swarf has been removed check the pipe ends to ensure that the surfaces are sufficiently trimmed and free from dirt and defects. If the surfaces are unsatisfactory; press the red button to return to the trimming stage.

Warning! Take extreme care not to touch the pipe ends at this stage and as soon as the pipes have been checked, proceed to the next stage.

11.3 Automated Check Cycle

After trimmer is removed, the LCD will indicate:

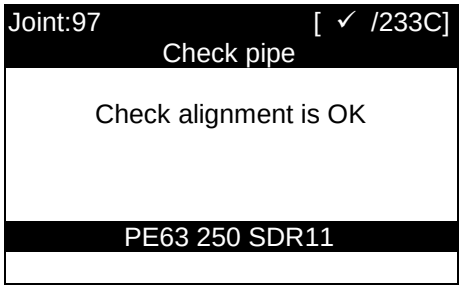
11.3.1 Pipe slippage check

When the green button is pressed the machine will close until the pipe ends make contact.

The machine will then automatically apply 20% above the maximum process force to ensure that the pipes will not slip during the jointing phases. If any slippage is detected, the machine will abort and show an appropriate error message.

11.3.2 Pipe alignment check

If no slippage is detected, the display will indicate:



As prompted, check the two pipes align correctly and that pipe to pipe contact is evident around the entire joint circumference. If acceptable, press the green button to continue the process. The control system will again check for slippage before opening. Do not open the fast-clamp levers at this stage, otherwise the machine with recognise there is a fault.

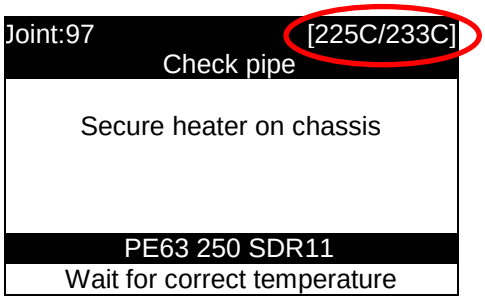
If the operator suspects there is a problem with pipe alignment or contact, pressing the red button will return to the check screen. Ultimately, if there is a problem, the pipe should be readjusted and re-trimmed.

After the ‘check’ and prior to the ‘join’ phase, the pipe ends will be separated. If the process was started with a very low heater temperature, the chassis will not open until the heater has reached the required temperature. Secure the heater onto the chassis and wait until the heater is at the correct temperature before pressing the green button when prompted.

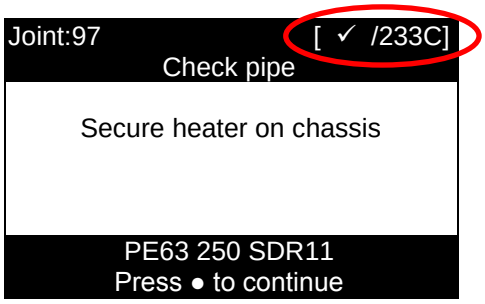
11.4 Automated Join Cycle

The machine automatically controls all aspects of the Butt Fusion Welding cycle.

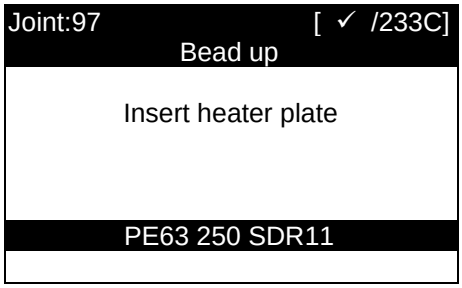
At the start of the join cycle, the system will wait until the correct heater temperature is achieved. Whilst the temperature is out of the specified limits (in this example the heater temperature is at 225ºC with a target of 233ºC), the display will indicate:



When the temperature is within the specified limits for that standard, the display will show:



Remove the heater from the stand and secure to the chassis as described in section 11.2.4. Press the green button and the display will indicate:



Using the two black handles either side of the heater, push the heater plate down between the two pipe ends. The display will change to:

Press the green button to continue the jointing process. The machine will display the following and will gradually build up the pressure in order to move the pipe. When the machine starts to move, the line pressure is measured and both the peak and dynamic drag pressure values are stored for calculating subsequent welding pressure.

11.4.1 Automatic bead-up stage

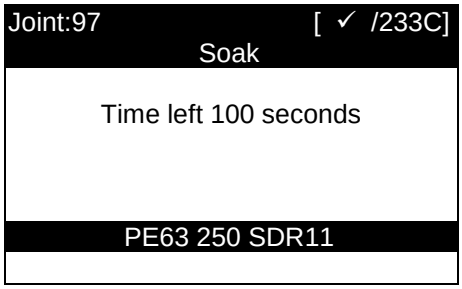
When the pipes come into contact with the heater plate, the display will indicate:

After several seconds the display will also indicate, “Please wait”.

Once the initial bead has correctly formed, the pressure is reduced ready for the heat soak phase.

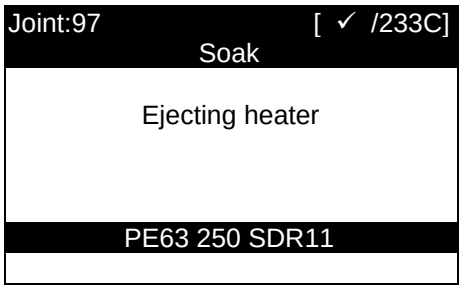
11.4.2 Automatic heat soak stage

During the heat soak phase the display indicates the soak time remaining, as shown below:



11.4.3 Automatic heater plate removal

At the end of the soak phase the alarm will sound and the machine will open and eject the heater. During automatic heater plate ejection, the display indicates:



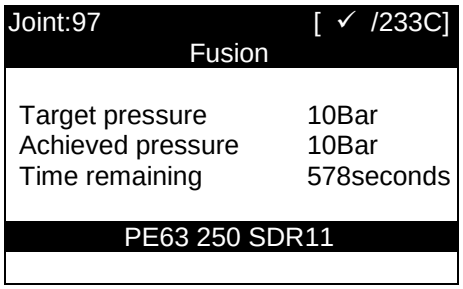
When the heater has been ejected, the machine will close.

11.4.4 Automatic pressure build-up

When the molten pipe ends come into contact with each other, the pressure builds up to the target welding pressure plus the drag pressure value measured previously.

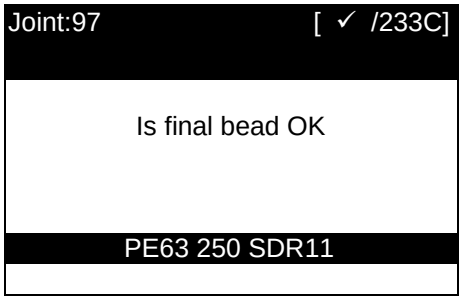
11.4.5 Automatic Fusion and cooling stage

The automatic fusion and cooling stages allow the joint to form and become solid before the clamps can be removed. During these stages, the display shows:



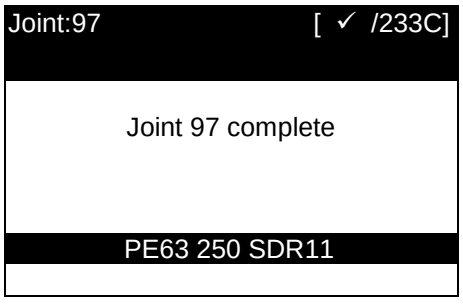
11.5.6 Accepting the joint

When the joint is complete the machine will prompt the operator for the bead to be inspected by showing the following:



If the bead is okay, press the green button. If not, press the red button.

Finally, the display will show:



Pressing the green button will prompt for entry of an operator code to start the next joint.

Manually aborting the cycle

At any stage the jointing cycle can be aborted by pressing the emergency stop button, this should only be in emergencies.

12 Error messages

During the welding cycle, the controller monitors the system for problems which could potentially result in poor joints. In the event of such a problem, or if an unexpected event occurs, a message is issued indicating its nature. The following shows the failure modes, likely causes and remedies.

The error message numbers have been retained from previous ABF products for consistency. Some of the old error messages have been removed since they no longer apply. Also included in the chart are other general faults.

Mode	Message	Reason	Possible cause	Remedy
1	**Not cutting**	Trimmer has not reached end point in allowed time	Blunt blades No blades fitted Trimmings are clogging the blades Poorly set blades	S**h**arpen or replace the blades. Fit blades. Press red button, open the machine and remove swarf from blades. Adjust the blade settings.
5	**Clamps loose**	Unexpected clamp movement was detected during the CHECK stage	Clamps or liners were not secure	Press red button, open the machine, reset the pipes, re-secure the pipes ensuring they are fixed firmly, then re-trim and re-check.
6	**Poor bead**	Bead not formed as expected in the allowed time	Wrong pipe parameters were selected	Press red button. Select the correct pipe type; start joint again.
7	**Long dwell (heater)**	Excessive heater plate removal time experienced	Heater stuck in non-up position Heater up switch faulty	Check heater and machine for obstructions. Contact supplier.
8	**Long dwell time**	Excessive heater plate removal time experienced	Heater not ejected quickly enough Machine movement obstructed	Check heater and machine for obstructions. Ensure pipes are well supported throughout the welding process.
11	**Heater plate present**	The heater plate has been detected at an inappropriate stage	Heater inserted in error	Press the machine open key to eject the heater and then follow the screen prompts.
12	**Trimmer present**	The trimmer has been detected at an inappropriate stage	Trimmer positioned in error	Remove the trimmer and follow the screen prompts.
13	**Excessive drag**	The measured drag exceeds 60 bar	Poorly supported pipes	Support the pipes using pipe support rollers

Mode	Message	Reason	Possible cause	Remedy
16	**Cool time short**	The machine has detected unexpected clamp movement during the welding cycle	Clamps were loosened prematurely	Press red button and abort the joint.
17	**Abort before joining**	Join cycle aborted	Emergency stop button pressed Power failed	Ensure generator has enough fuel. Do not switch off during process
18	**Abort during beadup**	Bead phase aborted	Emergency stop button pressed Power failed	Ensure generator has enough fuel. Do not switch off during process
19	**Abort during soak**	Soak phase aborted	Emergency stop button pressed Power failed	Ensure generator has enough fuel. Do not switch off during process
20	**Abort during fusion**	Fusion phase aborted	Emergency stop button pressed Power failed	Ensure generator has enough fuel. Do not switch off during process
21	**Abort during cooling**	Cooling phase aborted	Emergency stop button pressed Power failed	Ensure generator has enough fuel. Do not switch off during process
23	**No movement sensed**	Machine could not detect movement	Hydraulic connectors not connected correctly LVDT cable not connected correctly Pipes not correctly supported	Connect the hydraulic connectors Connect the LVDT cable correctly Use pipe support rollers
24	**Pressure out of limits**	Pressure achieved does not match that expected	Blocked hydraulic line filter Pressure control system error	Replace the filter Contact supplier
25	**Low oil**	Low oil detected	Controller not level Oil needs topping up	Ensure that the controller is positioned on level ground Top up with approved oil
27	**Trimmer current error**	The measured trimmer current is not as expected	Trimmer system jammed Current calibration fault	Remove blockage Contact dealer.
28	**Heater channels not balanced**	The two heater plate temperature measurements differ by more than 5 ºC	Faulty thermocouple in heater. Water ingress in plug or socket. Calibration fault.	Contact dealer. Spray with WD40, shake out excess and allow to dry Contact dealer
29	**Heater temperature high**	Heater plate temperature higher than specification limit	Overshoot when heating up from cold Wrong welding standard selected Calibration fault	Allow time for temperature to settle Wrong welding standard configured Contact dealer

Mode	Message	Reason	Possible cause	Remedy
31	**Heater UP/DOWN status**	The machine has detected that the heater is not up.	Faulty heater plate detection switch.	Contact dealer
32	**Abort during dwell**	Dwell phase aborted	Emergency stop button pressed Power failed	 Ensure generator has enough fuel. Do not switch off during process
33	**Abort during beadup (Expansion)**	Expansion phase aborted	Emergency stop button pressed Power failed	 Ensure generator has enough fuel. Do not switch off during process

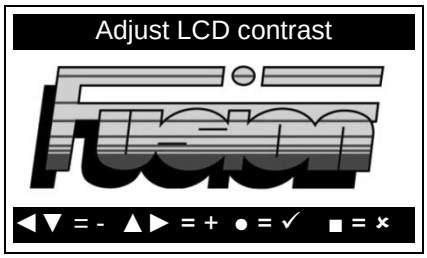
13 User menus

The User Menu allows the user to view and download joint data and System Variables, change contrast and erase the history data. To enter the User Menu, press the red button when in the information entry screen. Use the up and down buttons to highlight the required menu option then press the green button to select.

13.1 Adjust LCD contrast (Menu option 00)

Selecting this option will allow the LCD contrast to be adjusted from the keypad.

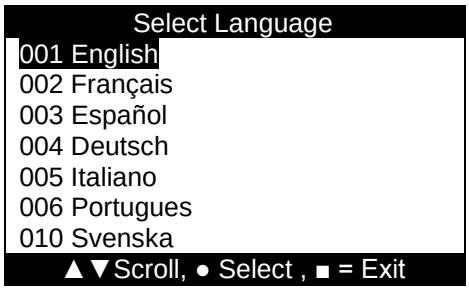
Pressing the up and down buttons on the keypad will adjust the LCD contrast in small steps. Pressing the left and right buttons on the key pad will adjust the LCD contrast in bigger steps. To confirm the LCD contrast and exit press the green button. Press the red button to exit without changing the contrast.



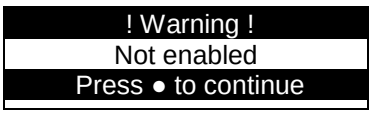
13.2 Set language (Menu option 01)

If enabled for user menu selecting this option will allow the User to set the operating language of the Gator computer.

Using the up and down button on the keypad select the required language. To confirm the language selected and exit, press the green button. Press the red button to exit without setting the language.

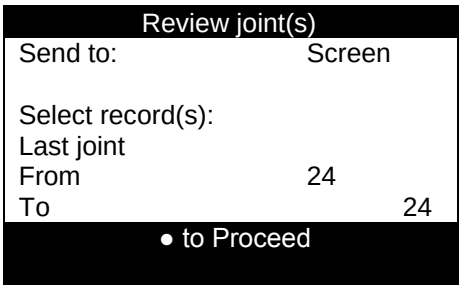


If not enabled for user menu selecting the following screen will be displayed if set language is selected.



13.3 Output joint record(s) (Menu option 02)

Selecting this option allows the operator to view joint data on the screen or download joint data to memory stick. View downloaded joint data in Microsoft® Notepad from output joint records option.



13.3.1 Send to

First use the up and down buttons to select ‘Send to’ then using the left and right buttons to select the destination for the joint data.

13.3.2 Screen

Display the joint data on the screen. See section 13.3.6 select record(s) view/download.

13.3.3 Printer

Send joint data to thermal printer. Connect printer to green printer socket on the rear of the computer. See section 13.3.6 select record(s) review/print.

13.3.4 USB drive

Down loads the joint data to memory stick so the data can be viewed in Notepad (Unicode Font must be used). Connect the memory stick to the USB ‘A’ connector on the rear of the computer. See section 13.3.6 select record(s) view/download.

13.3.5 PC

Down loads the joint data to PC so the data can be viewed in Notepad. Connect the green plug on the universal data transfer lead to the green printer socket on the rear of the computer and connect the other end of the universal data transfer lead to the serial port of the PC. See section 13.3.6 select record(s) review/print.

13.3.6 Select record(s) view/download

Using up and down buttons scroll to ‘Last joint’. Using the left and right buttons select the required joint selection choosing from.

13.3.6.1 Last joint

This gives the last joint fused. See section 13.3.6.7 sending data view/download.

13.3.6.2 All joints

This gives all the joints in the database. See section 13.3.6.7 sending data view/download.

13.3.6.3 Joint range

Allows a range of joints to be selected by scrolling down to ‘From’ or ‘To’ then using the left and right buttons on the keypad to select the joint range. See section 13.3.6.7 sending data view/download.

13.3.6.4 All complete

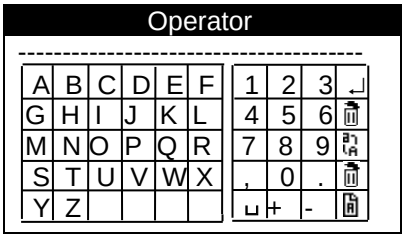
This gives all the complete joints in the database. See section 13.3.6.7 sending data view/download.

13.3.6.5 All incomplete

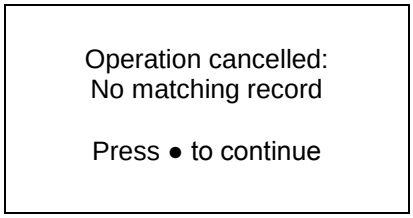
This gives all the incomplete joints in the database. See section 13.3.6.7 sending data view/download.

13.3.6.6 Matching criteria

This gives joint data for an operator and/or project by scroll to operator or project press green button to enter criteria the following screen will be displayed.



Scroll to the appropriate character using the up, down, left and right buttons on the keypad. Then press the green button on the keypad to select the character. For more information see section 5.1 character entry screen. If no match is found the following screen is displayed:



See section 13.3.6.7 sending data view/download.

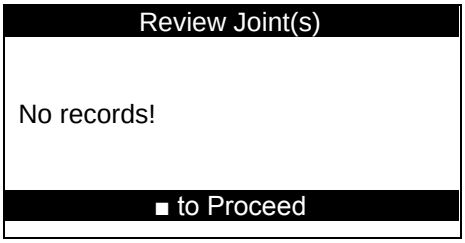
13.3.6.7 Sending data view/download

When the required joint selection has been made scroll down to ‘● to proceed’ then the relevant information will be given.

If the destination is the screen one joint at a time will be displayed. Use the up and down buttons on the keypad to scroll up and down the joint data. Press the green button to tab across to see the information that runs off the side of the screen. Use the left and right button to move on to the next joint. Press the red button on the keypad to exit.

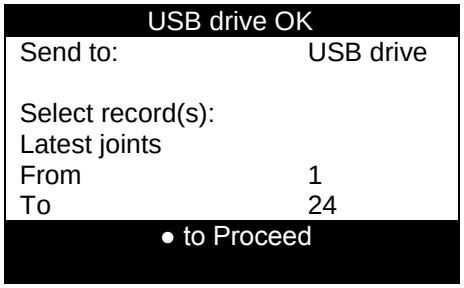
When joint data has been sent to USB drive the screen will display complete ‘press ● to continue’. The status bar at the bottom of the screen will show the status of the download see section 9 status bar.

If the database is empty the following screen is displayed.



13.4 JointManager (Menu option 03)

Selecting this option allows the operator to download joint data to USB drive, Minitran or PC and view joint data on JointManager.



13.4.1 Send to

First use the up and down buttons to select ‘Send to’ then using the left and right buttons to select the destination for the joint data.

13.4.2 USB drive

Download the joint data to a memory stick so that the data can be viewed on JointManager. Connect the memory stick to the USB A connector on the rear of the computer. See section 13.4.5 select record(s) data transfer.

13.4.3 Minitran

Download the joint data to Minitran so the data can be viewed on JointManager. Connect the green plug on the Minitran to the green printer on the rear of the computer. See section 13.4.5 select record(s) data transfer.

13.4.4 PC

Download the joint data to PC so the data can be viewed in JointManager. Connect the green plug on the universal data transfer lead to the green printer on the rear of the computer and connect the other end of the universal data transfer lead to the serial port of the PC. See section 13.4.5 select record(s) data transfer.

13.4.5 Select record(s) data transfer

Using up and down buttons scroll to ‘Latest joints’. Using the left and right buttons select the required joint selection choosing from.

13.4.5.1 Latest joints

Download joint data that has not yet been downloaded. If all the joints have been downloaded 'No new joints.' will be displayed under 'latest joints'. See section 13.4.5.5 sending data transfer.

13.4.5.2 All joints

Downloads all the joint data, which is stored in the database. See section 13.4.5.5 sending data transfer.

13.4.5.3 Joint range

Allows a range of joints to be selected by scrolling down to 'From' or 'To' then using the left and right buttons on the keypad to select the joint range. See section 13.4.5.5 sending data transfer.

13.4.5.4 Last joint

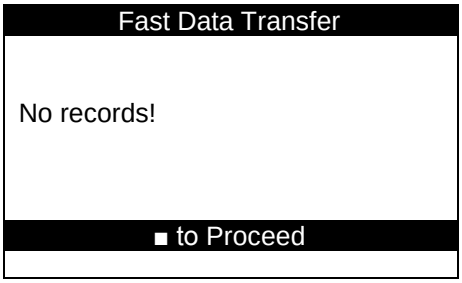
Downloads the last joint fused. See section 13.4.5.5 sending data transfer.

13.4.5.5 Sending data transfer

When the required joint selection has be chosen scroll down to '● to proceed'. The status bar at the bottom of the screen will show the status of the download see section 9 status bar.

When joint data has been sent to USB drive, PC or Minitran the screen will display complete 'press ● to continue'.

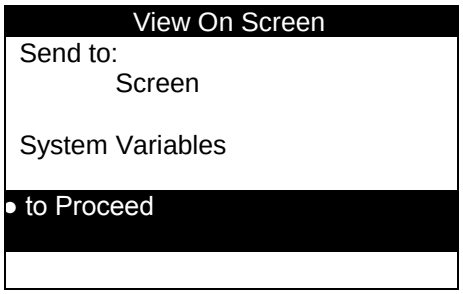
If the database is empty the following screen is displayed.



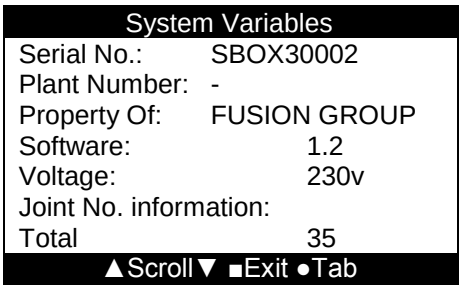
13.5 System variables (Menu option 04)

Selecting this option allows the operator to view the current system settings, e.g. serial number, property off, software version, joint number and the set options, on the screen or download current system settings to memory stick to view joint data in Microsoft® Notepad.

Use the up and down buttons on the keypad to scroll up and down the system variables. Press the green button to tab across to see the information that runs off the side of the screen. Press the red button on the keypad to exit system variables. This information may be asked for when contacting Fusion Group.



Refer to section 13.3.1 for how to select other Send to: destinations for the System Variables data. The first screen of information is shown below.



13.6 Remove user history (Menu option 05)

Selecting this option will allow all the user history to be erased.

Press the green button to proceed and erase the user history. Press any other button to exit the Remove user history menu option.

13.7 Recover archived records (Menu option 06)

Selecting this option will allow the user to recover records previously archived to the SD card.

Press the green button to access the archived files, then use the up, down and green button to select the archive file to be recovered. When the green button is pressed the computer will prompt the user to connect a memory stick, it will then proceed to transfer the selected data to the memory stick.

Pressing the red button will cancel to procedure.

13.7 Daylight saving (Menu option 07)

Selecting this option will allow the user to toggle the daylight saving.

Press the green button to access the daylight saving option, then press the green button to add or remove an hour from the time. Press the red button to exit daylight saving.

14 User diagnostics menu

To enter the user diagnostic menu turn on the unit, when the logo screen is displayed press the red button then press the red button again.

14.1 Test / Calibration (01)

The options in test / Calibration allow the operator to test relevant parts of the Gator machine.

Press the green button to enter the test / calibration menu option then use the up and down buttons to select the relevant menu option then press green button to enter the menu option.

14.1.1 Chassis diagnostics (01)

This option allows the checking of chassis recognition and chassis operation.

14.1.2 Trimmer diagnostics (02)

This option allows the checking of the trimmer operation.

14.1.3 Heater diagnostics (03)

This option allows the checking of the heater operation.

14.1.4 Computer diagnostics (04)

This option allows the checking of the computer operation.

14.1.5 Hydraulic diagnostics (05)

This option allows the checking of the hydraulic operation.

14.1.1 Test scanner (07)

The test scanner option allows the barcode scanner to be tested.

Scan a barcode then the barcode and the length of the barcode will be displayed on the screen.

15 Specification

Supply		Gator 180, 250 & 315		
		Minimum	Typical	Maximum
Input voltage	110V	97v	110v	150v
	220V	195v	230v	265v
Input frequency		40Hz	50Hz	60Hz

Power requirements	180	250	315
Trimmer	750 watt	750 watt	750 watt
Heater	1500 watt	1800 watt	3300 watt
Controller	1200 watt	1200 watt	1200 watt
Generator	3.5 KVA	4 KVA	6 KVA

Note: Due to software control, the maximum power demand = Heater + Controller.

Environment	Gator 180, 250 & 315	
	Minimum	Maximum
Operating temperature	-10°C	+40°C
Storage temperature	-15°C	+45°C
Environmental protection	IP54	

Pipe & joining parameters		Gator 180, 250 & 315	
		Minimum	Maximum
Diameter range	Gator 180	63mm	180mm
	Gator 250	63mm	250mm
	Gator 315	90mm	315mm
Joining pressure		10Bar	60Bar
Heater removal time		1.3s	3.5s
Heater temperature 110V		233°C	
Heater temperature 220V		205°C, 210°C, 215°C, 220°C, 225°C & 233°C	
SDR range		7.25, 7.4, 9, 11, 13, 13.6, 17, 17.6, 21 26, 33, 67	
Welding standards		DVS2207-1	WIS4-32-08
		GIS/PL2-3 (GB)	Osaka Gas
		Japan	Toho Gas
		S/EM-044-E Part 1	UK WIR 90°C Fastweld
		Fusion FW Landfill	DVS-215°C
		DS/INF (Insta)	DVS2207-11 Polyprop.
		UNI 10520	Gaz du France
		Mesco	UNI 10967
		TSG	HKCG (BG)
		ISO21307 SLP	ISO21307 DLP

Joining sequence details	Gator 180, 250 & 315	
	Automatic	Manual
Trim	✓	
Check (slippage)	✓	
Check (Alignment)		✓
Bead-up phase	✓	
Soak phase	✓	
Heater removal	✓	
Pressure build-up	✓	
Fusion phase	✓	
Cooling phase	✓	

Communication ports	Gator 180, 250 & 315
USB	✓
Bluetooth	✓
Printer/PC	✓

Printer port transmission	Gator 180, 250 & 315
Protocol	RS232
Speed	1200 Baud
Parity	None
Data bits	8
Stop bits	1

Unit weights	**180**	**250**	**315**
Trimmer	12Kg	14.5Kg	19Kg
Heater	17Kg	21.5Kg	29.5Kg
Chassis (without cradle)	39Kg	45Kg	62Kg
Chassis (with cradle)	44Kg	51Kg	68.5Kg
Controller	46Kg	46Kg	46Kg
Gross weight	119Kg	133Kg	163Kg

Dimensions		Height	Depth	Width
180	Trimmer	382mm	260mm	445mm
	Heater	440mm	200mm	570mm
	Chassis (without cradle)	TBC	TBC	TBC
	Chassis (with cradle)	560mm	430mm	323mm
	Controller	470mm	430mm	560mm
250	Trimmer	490mm	290mm	450mm
	Heater	800mm	250mm	530mm
	Chassis (without cradle)	390mm	500mm	660mm
	Chassis (with cradle)	430mm	650mm	760mm
	Controller	470mm	430mm	560mm
315	Trimmer	560mm	290mm	550mm
	Heater	900mm	250mm	630mm
	Chassis (without cradle)	460mm	625mm	690mm
	Chassis (with cradle)	TBC	TBC	TBC
	Controller	470mm	430mm	560mm

Cable and hose lengths	Gator 180, 250 & 315
Input	5m
Trimmer	5m
Heater	5m
Chassis	5m
Hydraulic hoses	5m

Standards	Gator 180, 250 & 315
ISO12176-1	✓
ISO12176-3	✓
ISO12176-4	✓

16 Rights

Due to Fusion's policy of continued development and improvement, we reserve the right to modify products without prior notice.

17 Accessories

Below is a list of accessories and Fusion order numbers:

Order No.	Description
742182	Memory stick
23070	180 Chassis cradle
22481	250 Chassis cradle
12668	315 Chassis cradle

Appendix A Gator Manual entry character set

The Gator character sets are shown below:

A.1 Number character set.

0 1 2 3 4 5 6 7 8 9 . - + , ␣ (␣ - represents a SPACE).

A.2 ABC font set

A.2.1 Upper case characters

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A.2.2 Lower case characters

a b c d e f g h I j k l m n o p q r s t u v w x y z

When the green button is held down for more than 3 seconds when on the selected character the following characters will be displayed.

Selected character	Displayed characters	Selected character	Displayed characters
A	À Á Â Ã Ä Å Ā Ă Ą	**a**	à á â ã ä å ā ă ą
C	Ç Ć Ĉ Ċ Č	**c**	ç ć ĉ ċ č
D	Ď		
E	È É Ê Ë Ē Ĕ Ė Ę Ě	**e**	è é ê ë ē ĕ ė ę ě
G	Ĝ Ğ Ġ Ģ	**g**	ĝ ğ ġ ģ
H	Ĥ	**h**	ĥ
I	Ì Í Î Ï Ĩ Ī Ĭ Į İ	**i**	ì í î ï ĩ ī ĭ į
J	Ĵ	**j**	ĵ
K	Ķ	**k**	ķ
L	Ĺ Ļ Ŀ Ł	**l**	Í ļ ŀ ł
N	Ñ Ń Ņ Ň Ŋ	**n**	ñ ń ņ ň ŋ
O	Ò Ó Ô Õ Ö Ø Ō Ŏ Ő	**o**	ò ó ô õ ö ø ō ŏ ő
R	Ŕ Ŗ Ř	**r**	ŕ ŗ ř
S	ß Ś Ŝ Ş Š	**s**	ś ŝ ş š
T	Ţ Ť	**t**	ţ
U	Ù Ú Û Ü Ũ Ū Ŭ Ů Ű Ų	**u**	ù ú û ü ũ ū ŭ ů ű ų
W	Ŵ	**w**	ŵ
Y	Ý Ŷ Ÿ	**y**	ỳ ÿ ŷ
Z	Ź Ż Ž	**z**	ź ż ž

A.3 Russian

A.3.1 Upper case characters

А Б В Г Д Е Ж З И Й К Л М Н О П Р С Т У Ф Х Ц Ч Ш Щ Ъ ЭЮ Я

A.3.2 Lower case characters

а б в г д е ж з и й к л м н о п р с т у ф х ц ч ш щ ъ эю я

When the green button is held down for more than 3 seconds when on the selected character the following characters will be displayed.

Selected character	Displayed characters	Selected character	Displayed characters
Ъ	Ь Ы	**ъ**	ь ы

A.4 Japanese

A.4.1 Upper case characters

ア カ サ タ ナ ハ マ ヤ ラ ワ ー ゛ ゜

A.4.2 Lower case characters

ァ ヵ サ ッ ナ ハ マ ャ ラ ヮ - ゛ ゜

When the green button is held down for more than 3 seconds when on the selected character the following characters will be displayed.

Selected character	Displayed characters	Selected character	Displayed characters
ア	イ ウ エ オ	ァ	ィ ゥ ェ ォ
カ	キ ク ケ コ	ヵ	
サ	シ ス セ ソ	サ	
タ	チ ツ テ ト	ッ	チ ッ テ ト
ナ	ヌ ニ ネ ノ ン	ナ	
ハ	ヒ フ ヘ ホ	ハ	
マ	ミ ム メ モ	マ	
ヤ	ユ ヨ	ャ	ュ ョ
ラ	リ ル レ ロ	ラ	
ワ	ヲ	ヮ	

A.5 Symbol

! ¿ # $ % & ’ ( ) * ` / : ; < = > ? @ [ ] ^ { | } ~ ° ± µ Ω

Declaration of Conformity

EC

Declaration of Conformity
In accordance with EN ISO 17050-1:2004

We **Fusion Group Limited**
Of Fusion House
Chesterfield Trading Estate
Chesterfield
Derbyshire S41 9PZ
England

In accordance with the following Directives(s)

2004/108/EC	The Electromagnetic Compatibility Directive
2006/42/EC	The machinery Directive

Hereby declare that:

Product(s)	Model Number(s)
Gator 180 110/220V 50Hz	*G180110/220AFE*
Gator 250 110/220V 50Hz	*G250110/220AFE*
Gator 315 110/220V 50Hz	*G315110/220AFE*
Gator 400 (Mk2)110/220V 50Hz	*G400MK2110/220AFE*

Is in conformity with the applicable requirements of the following documents:

Ref No:	Title:	Edn/date
BS EN ISO 12100-1&2	Safety of machinery. Basic concepts, general principles for design	2003
BS EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements	2001
BS EN 982	Safety of machinery. Safety requirements for fluid power systems and their components. Hydraulics	1996
EN 61000-6-2	Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments	2005
EN 61000-6-4	Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments	2007

To maintain compliance with the appropriate Directives, this equipment shall only be used on electrical supplies independent of direct connection to domestic premises.
This declaration shall become invalid if modifications are made to the equipment without prior written approval from the manufacturer.

CE

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