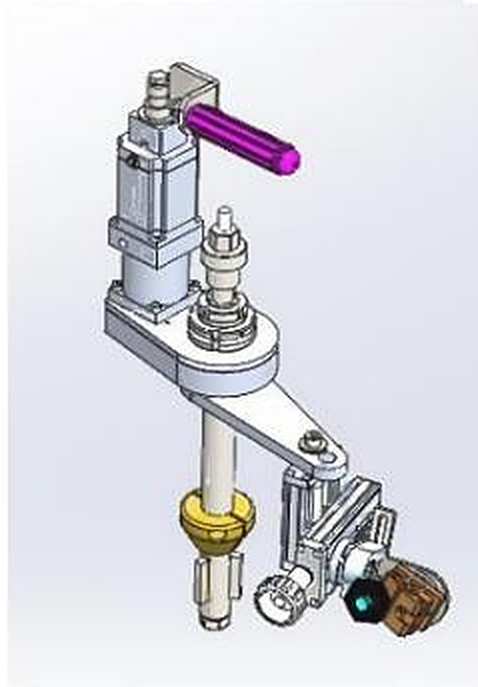


CO₂ Gas-Shielded Tube-Sheet Welding Machine

TubeSeal H89

Automatic tube-to-tube-sheet welding head

Operating Instructions



Read these operating instructions carefully before using the machine and keep them at hand for reference at any time.

Preface

Thank you for purchasing this Cruxweld automatic welding product. We will accompany your use of this product with sincere service.

In order to support our service, we recommend that you read this manual carefully before using the product. It provides detailed information about the basic structure, product functions, methods of use and technical parameters of this product, for your reference and study during actual use. During use, we recommend that you keep this manual at hand for reference at any time.

The pictures, text and data in this material are for reference only. As the product is constantly being improved, the actual product may differ. The specific data is subject to the actual product supplied.

If you have any doubts or corrections regarding the contents of this manual, or regarding this product, please contact our service team. Our customer service staff will provide you with professional support and will sincerely accept your comments and corrections. Feel free to contact us at any time.

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Before Use, Please Read

To ensure safe operation, please be sure to comply with the following matters.



Warning! Be careful to avoid major personal accidents

- **Wearing of clothing and safety gear**

To prevent eye inflammation and skin burns, be sure to follow the labour safety and hygiene rules and wear the corresponding protective gear.

- **Precautions for ventilation**

To prevent poisoning and suffocation from harmful gases (welding fumes and gases are harmful to human health), it is necessary to comply with the rules regarding dust and fume hazards, to install local exhaust devices, or to use effective respiratory protective equipment.



Attention! Prevent machine burnout and fire-related accidents

- **Prevent fires and machine burnout caused by overheating**

Keep flammable items at least 50 cm away.

- **Prevent fire accidents and machine damage caused by sparks**

Remember not to let sparks (spatter and flashes) fly onto flammable materials.

- **Guard against bumps and machine damage caused by drops**

When installing this machine on the workpiece or rack, make sure it is secure so that it cannot slip off.

- **The operation manual must be read**

Read the operation manual carefully before using this machine.

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1. Special Points

The Cruxweld **TubeSeal H89** gas-shielded tube-sheet welding machine is a mechatronic product, used mainly for the automatic welding of boiler tube sheets, tube-box tube sheets, air pre-heater tube sheets and various heat-exchanger tube sheets.

It can carry out automatic welding of flat corner welds in the form of tube extension, and of butt welds in the form of tube alignment.

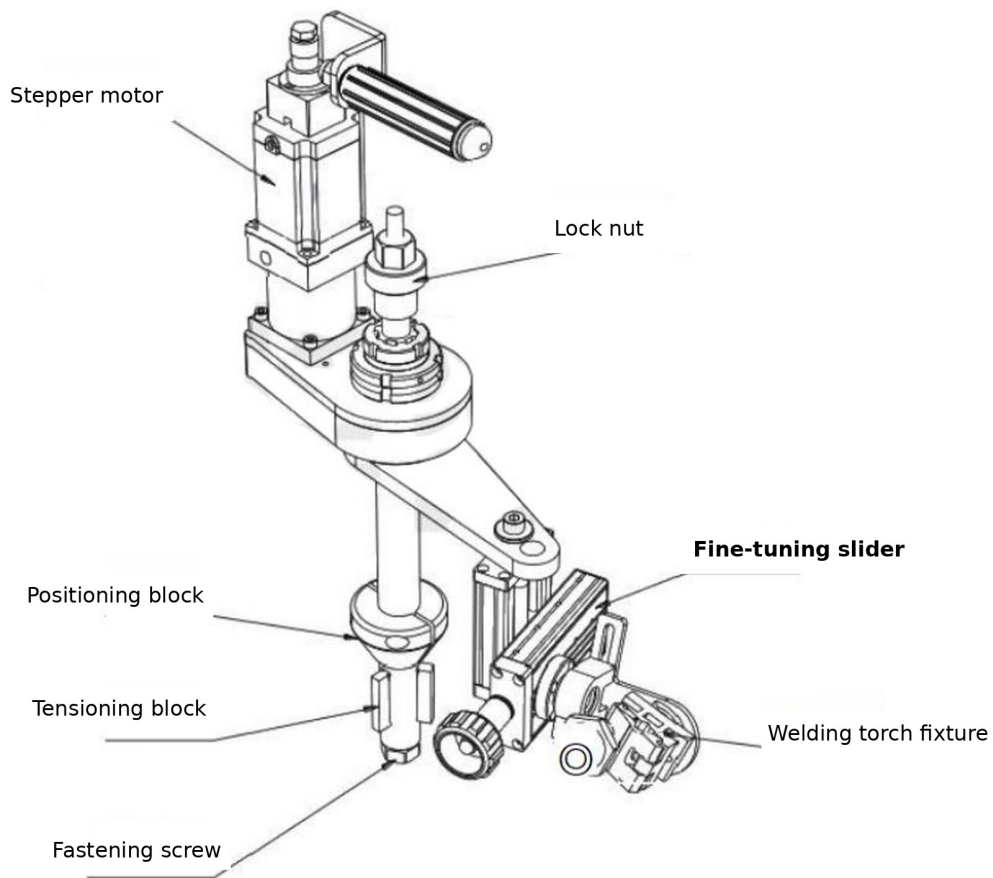
The TubeSeal H89 uses a melting-electrode (MIG/MAG) process and is controlled by a programmable controller with an integrated touch-screen human-machine interface. Operation is intuitive, reliability is high and the system is easily expandable. Compared with manual arc welding it reduces the operating effort, lowers the labour intensity of the workers, improves the production efficiency of welding, ensures the quality of the product weld and saves production costs.

Main advantages

- Fully automatic rotation of the welding torch around the tube, with the rotation angle set on the screen.
- Consistent weld quality that does not depend on the skill of the operator.
- Lower labour intensity and a better working environment.
- Higher welding productivity and lower production cost.
- Light and portable head — the complete equipment weighs only 7 kg.
- Self-centring mounting in the tube bore by means of a tensioning block.

Note
The inner-diameter tensioning range of this equipment is 28 - 76 mm. Select the appropriate tensioning block according to the inner diameter of the steel tube. The total weight of the equipment is 7 kg.

2. Outline Drawing



TubeSeal H89 — outline drawing and main components

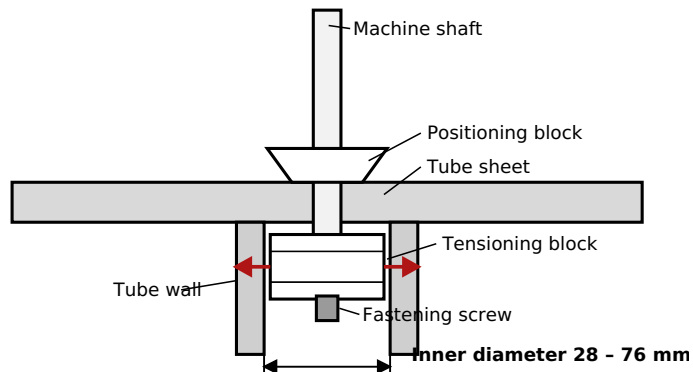
3. Description of Main Components

Component	Function
Stepper motor	Actuator / drive device that rotates the welding torch around the tube. Supplied from an AC 220 V power supply.
Lock nut	Used for locking and releasing the device. Turning the lock nut to the right secures the equipment to the workpiece; the reverse operation separates the equipment from the workpiece.
Fine-tuning slider	Mechanism for adjusting the position of the welding torch. The adjustment range is ± 60 mm in the X direction and ± 60 mm in the Y direction.
Welding torch fixture	Clamping device for the welding torch. The angle of the welding torch can be adjusted within $\pm 90^\circ$.
Positioning block	Locates the head against the tube sheet. It is a wear part and should be replaced in good time when worn. Only one positioning block is fitted to the equipment.
Tensioning block	Expands inside the tube bore to hold the machine concentric with the tube. The block is selected according to the inner diameter of the tube (range 28 – 76 mm).
Fastening screw	Secures the tensioning block to the shaft of the machine.

Click the corresponding button on the touch panel to enter the corresponding interface. The three interfaces — Run screen, Manual screen and Parameter screen — are described in section 5.

4. Selection and Installation of Tensioning Blocks

Measure the inner diameter of the tube to be processed and then select the appropriate tensioning block for that diameter. The inner-diameter tensioning range covered by the equipment is **28 - 76 mm**; select the block whose marked range covers the measured inner diameter.



Principle of mounting: the tensioning block expands inside the tube, the positioning block rests on the tube sheet

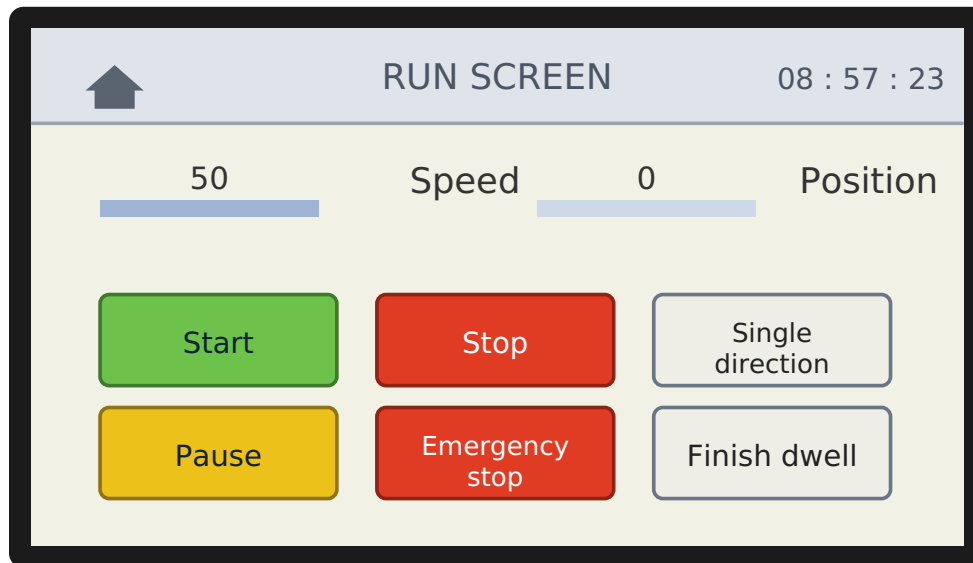
Installation procedure

1. Measure the inner diameter of the tube and select the matching tensioning block.
2. Fit the tensioning block onto the shaft of the machine and secure it with the **fastening screw**.
3. Insert the tensioning block into the tube bore until the **positioning block** rests squarely on the tube sheet.
4. Turn the **lock nut** to the right to expand the tensioning block and clamp the machine to the workpiece. Check that the head cannot be moved by hand.
5. After welding, turn the lock nut in the reverse direction to release the tensioning block and remove the machine from the tube.

5. Instructions on the Control Panel

5.1 Run screen

Click the “Run Screen” button on the “Panel” interface to enter this interface.



Run screen of the TubeSeal H89 touch panel

Start button: this is the welding start function. Clicking this button initiates the welding arc, and the motor rotation starts synchronously. The mechanical **Start** button on the panel has the same function.

Pause key: for the pause function at any time during the welding process. Click this key to stop the arc of the welding gun and the rotating motor. If the pause button is clicked again, welding of the remaining weld seam continues from the current state.

Complete return to origin: returns the head to the origin in any case. The origin position is set manually and is available in the Parameter interface. Adjust the position required for welding by hand, then click the origin confirmation; this becomes the origin for subsequent welding.

Stop key: this key is pressed while the motor is rotating, regardless of whether the arc has been initiated or not, and is treated as a welding stop.

Emergency stop: stops the arc and all motor movement immediately. Use it only in an emergency; re-start from the origin afterwards.

Single direction: selects rotation in one direction only for the welding run.

Position: this bar shows the actual position and cannot be set here. If it has to be changed, modify it in the Parameter interface.

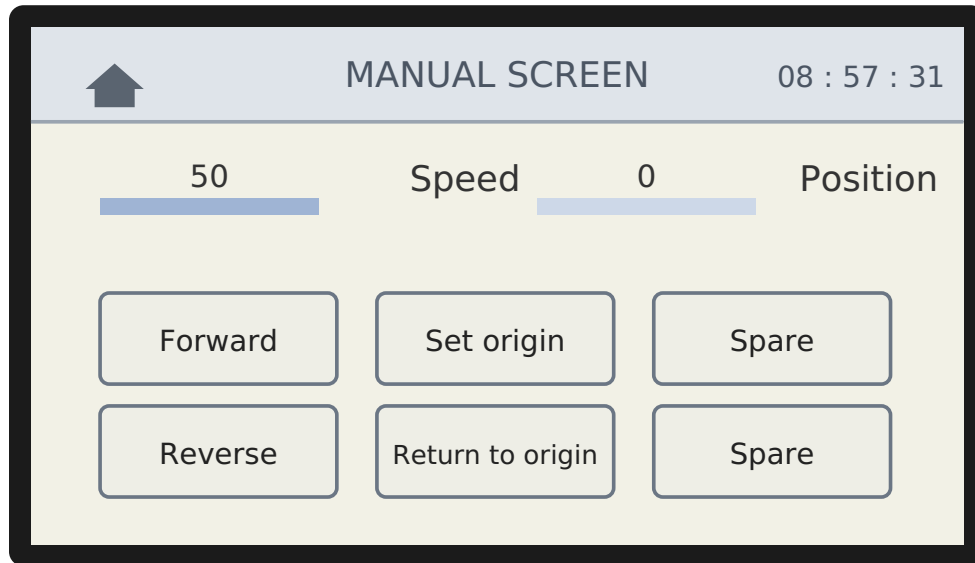
Speed: the welding rotation speed can be set freely in this interface.

 Attention

Before pressing **Start**, make sure that the machine is firmly clamped in the tube, that the welding torch angle and the X/Y position are correctly set, and that the shielding-gas supply and the wire feeder are ready.

5.2 Manual screen

Click the **“Manual Screen”** button on the **“Panel”** interface to enter this interface and make the relevant settings.

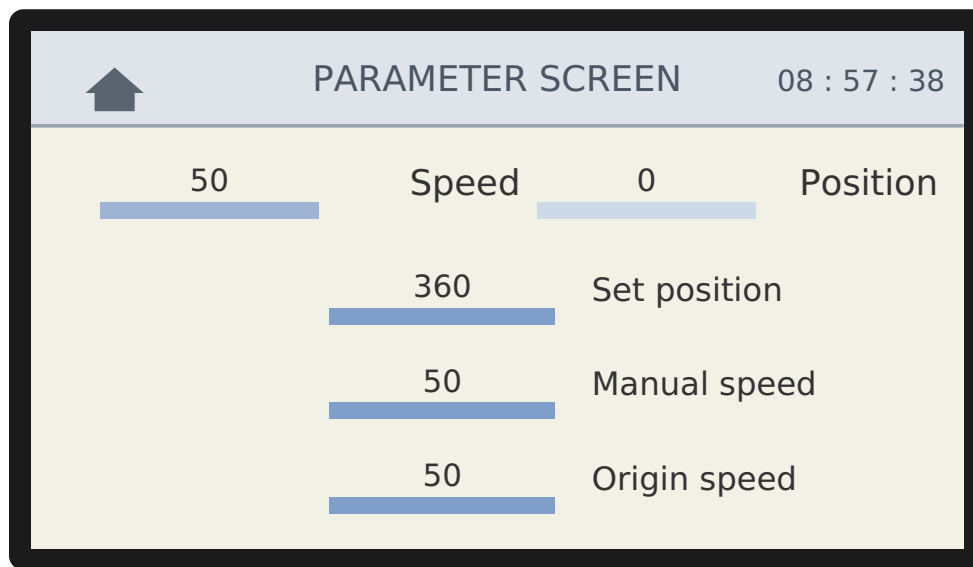


Manual screen of the TubeSeal H89 touch panel

Key	Function
Forward	Rotates the welding torch in the forward direction by hand, without welding.
Reverse	Rotates the welding torch in the reverse direction by hand, without welding.
Set origin	Confirms the current position as the origin for subsequent welding runs.
Return to origin	Returns the welding torch to the stored origin position.
Spare	Reserved keys for future functions.

5.3 Parameter screen

Click the “**Parameter Screen**” button on the “**Panel**” interface to enter this interface.



Parameter screen of the TubeSeal H89 touch panel

Set position: this box sets the rotation angle for welding, and the angle can be set arbitrarily. For example, 180 degrees means that the welding torch stops automatically after half a turn and returns to the starting point; if 720 degrees is set, the welding torch rotates two turns and then returns to the original point.

Manual speed: the speed at which the torch rotates left or right when it is moved by hand from the Manual screen, without welding.

Origin speed: the speed at which the head returns to the origin after welding has been completed.

6. Main Technical Parameters

Item	Data
Model	Cruxweld TubeSeal H89
Type	CO ₂ gas-shielded automatic tube-sheet welding machine, melting electrode (MIG/MAG)
Control system	Programmable controller with touch-screen human-machine interface
Drive	Stepper motor
Power supply	AC 220 V
Tube inner-diameter tensioning range	28 – 76 mm (tensioning block selected to suit)
Welding torch fine adjustment	X direction ±60 mm; Y direction ±60 mm
Welding torch angle adjustment	±90°
Rotation angle (Set position)	Freely settable on the Parameter screen (for example 180°, 360°, 720°)
Speed settings	Welding speed, manual speed and origin speed, each set on the screen
Weld types	Flat corner welds with tube extension; butt welds with tube alignment
Typical applications	Boiler tube sheets, tube-box tube sheets, air pre-heater tube sheets, heat-exchanger tube sheets
Total weight of equipment	7 kg

The specifications and technical content of this product are subject to change without notice. The specific data is subject to the actual product supplied.

7. Operating Sequence

1. Connect the machine to the **AC 220 V** supply and connect the welding torch to the wire feeder and the welding power source. Open the shielding-gas supply.
2. Measure the inner diameter of the tube, fit the matching **tensioning block** and secure it with the fastening screw (see section 4).
3. Insert the head into the tube until the **positioning block** is seated on the tube sheet, then turn the **lock nut** to the right to clamp the machine in place.
4. Set the angle of the welding torch with the **welding torch fixture** ($\pm 90^\circ$) and set the torch position with the **fine-tuning slider** (X and Y, ± 60 mm each).
5. Open the **Manual screen**. Use **Forward** and **Reverse** to bring the torch to the required starting position, then press **Set origin**.
6. Open the **Parameter screen** and set the **Set position** (rotation angle, for example 360°), the **Manual speed** and the **Origin speed**.
7. Open the **Run screen** and set the welding **Speed**. Select **Single direction** or **Finish dwell** if required.
8. Press **Start**. The arc is struck and the motor rotates synchronously. Use **Pause** to interrupt and resume the run, **Stop** to end it and **Emergency stop** in an emergency.
9. When the set angle has been completed, the torch stops automatically and returns to the origin at the origin speed.
10. Turn the lock nut in the reverse direction to release the tensioning block and remove the machine from the tube.

8. Wear Parts, Care and Storage

Part	What to check
Positioning block	A wear part. Check it for wear before each shift and replace it in good time; a worn block lets the head sit crooked on the tube sheet and the weld point will not match the target position.
Tensioning block	Check that the expanding faces are clean and undamaged and that the block still clamps firmly in the tube bore.
Fastening screw	Check that it is tight before every run.
Lock nut	Keep the thread clean; if it becomes stiff, clean it and apply a little light machine oil.
Fine-tuning slider	Remove spatter and dust from the slide ways so that the X and Y adjustment stays smooth.
Welding torch and fixture	Remove spatter from the nozzle and the contact tip; check that the fixture holds the torch without play.
Cables and hoses	Check the power lead, torch cable and gas hose for damage; replace a damaged part before use.

General care

- Switch off the power supply before cleaning the machine or changing any part.
- Keep the machine, and especially the touch panel, clean and free of dust and spatter. Wipe with a dry or slightly damp cloth only.
- Do not drop the head or knock it against the workpiece; it is a precision assembly.
- Store the machine and the tensioning blocks in a dry place, away from damp and from corrosive fumes.

For spare parts, tensioning blocks and service support, contact Cruxweld at support@cruxweld.com or +91 8800 882 983, quoting the model **TubeSeal H89**.



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