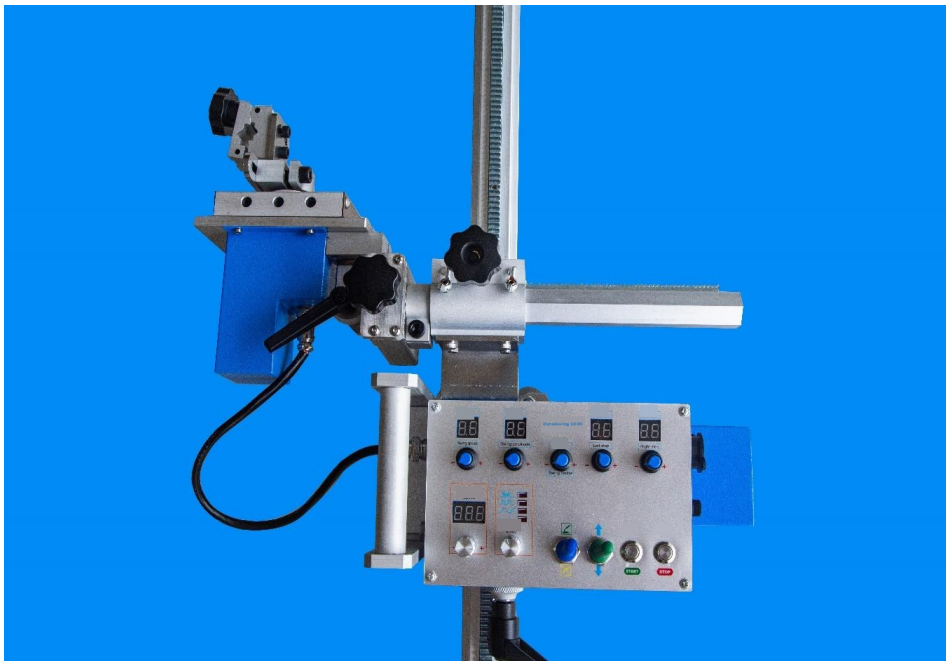


CO₂ Gas-Shielded Automatic Welding Trolley

DynaSwing 100K

Instructions for Use



Preface

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

So that we can support you properly, we recommend that you read this instruction manual carefully before using the product. It gives detailed information about the basic structure, the functions, the methods of use and the technical parameters of the machine, for your reference during actual use.

During use, we recommend that you keep this manual to hand so that it can be consulted at any time.

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

Before use, please note

To ensure safe operation, be sure to observe the following.



Warning! Be careful to avoid serious personal accidents

- **Clothing and safety equipment**

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

- **Precautions for ventilation**

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



Attention! Prevent machine burnout and fire accidents

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

Keep flammable items at least 50 cm away.

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

Do not let sparks (splashes and flashes) reach flammable materials.

- **Prevent impact damage caused by the machine falling**

When installing the machine on the rail, make sure it is secure so that it cannot slip off.

- **The operating manual must be read**

Read this manual carefully before using the machine.

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1. Summary

The Cruxweld **DynaSwing 100K** CO₂ automatic welding trolley is widely used in industries such as shipbuilding, bridges, locomotives, steel structures and petrochemicals. It is suitable for welding a wide variety of structures, such as stiffened plates, ribbed plates, intersections and box girders. Its main advantages are:

- It reduces labour intensity and improves the working environment.
- It increases working efficiency to about 1.5 times that of manual welding.
- It avoids the poor weld quality caused by human factors. The defect rate of manual operation is generally around 20%, whereas there is practically no such defect rate with the automatic welding trolley. The overall benefit is therefore nearly 200% higher than with manual welding.
- The high degree of automation ensures the stability of welding quality.
- No highly skilled technical workers are required.

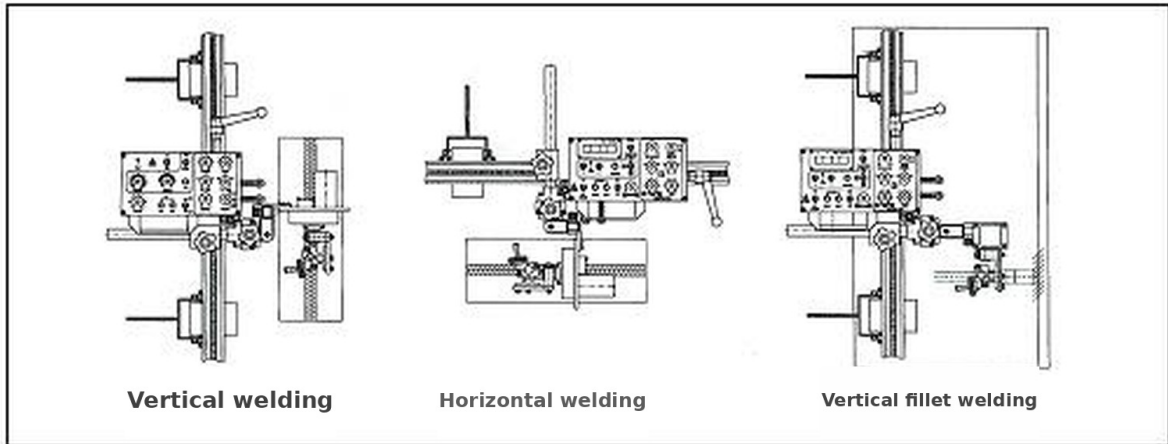
This trolley is rack-driven welding equipment, widely used for horizontal and vertical butt welding and particularly suitable for medium and thick plate welding. By adjusting the position and angle of the welding torch, fillet welding, cross welding and overhead welding can also be performed. The trolley body, the swing device and the control panel are integrated, and the machine welds while moving along the rail. The rail is attached to the workpiece with strong magnets and is easy to install and remove.

2. Features

1. It can be used for various positions, such as vertical welding, transverse welding and horizontal welding.
2. It has a straight-line swing function. A variety of swing parameters can be adjusted — swing mode, swing amplitude, swing speed, swing centre position, and left and right dwell time.
3. The travel speed of the trolley is shown on a digital display.
4. The left and right swing dwell time adjustment prevents undercutting and lack of fusion during weave welding.
5. When welding stops, the welding torch automatically returns to the centre position of the weld bead.
6. It has an automatic arc-stop function.
7. It has a fast return function.
8. The standard configuration provides rails 1.5 m long. The rail is compact, lightweight and easy to move, and rail sections can be joined for extended use.

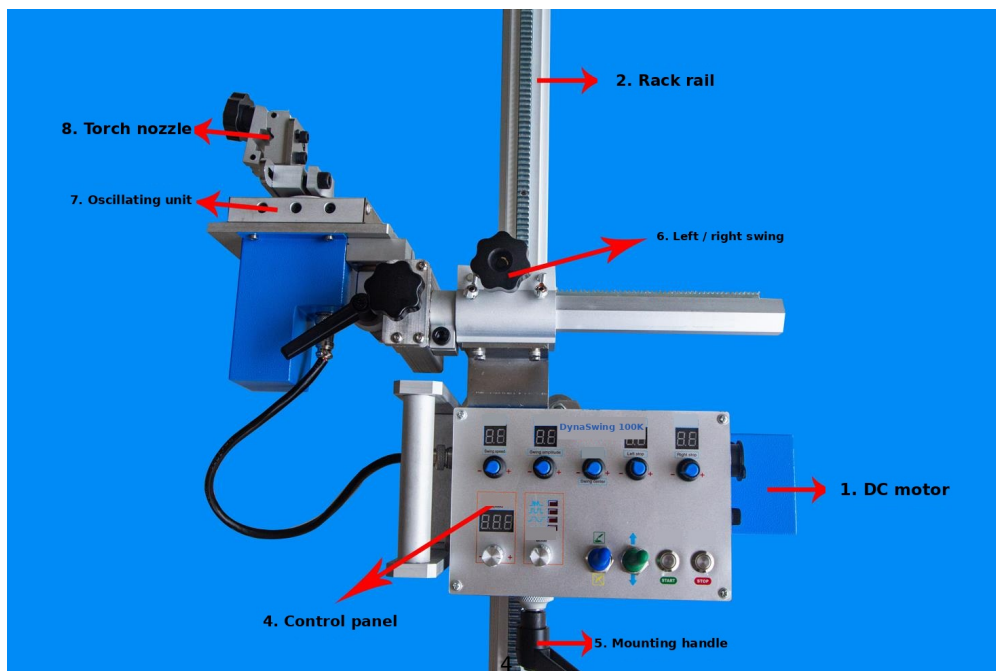
3. Applicable environment

The machine is generally used for regular vertical butt welds and horizontal butt welds. Fillet welds and cross welds can also be performed by adjusting the position and angle of the welding torch.



Typical working positions of the DynaSwing 100K

4. Outline drawing and description of main components



- ① **DC motor:** the power unit for the trolley's movement. It uses an AC 220 V power supply.
- ② **Rails:** aluminium rigid rails, standard configuration 1.5 m; rail sections can be joined for extended use.
- ③ **Mounting magnets for the rails:** the fixing devices for the rails. They generate 60 kg of holding force and attach firmly to the workpiece. A detachable handle allows the rail to be removed and moved easily.
- ④ **Control panel:** the control centre of the trolley, from which all movements are controlled.
- ⑤ **Mounting handle:** the track wheel clutch device of the trolley. When installing, turn this handle to open the track wheel. After the track wheel is clamped onto the rail, release the handle and the track wheel locks automatically. The quick return function is enabled when the handle is in the half-clutch position.
- ⑥ **X-Y slider:** the mechanism for adjusting the position of the welding torch. The X-direction adjustment range is ± 20 mm and the Y-direction adjustment range is ± 20 mm.
- ⑦ **Oscillating motor:** the drive unit of the oscillator. It uses a high-precision DC motor with a power of 6 W.
- ⑧ **Welding torch clamp:** the clamping device for the welding torch. The angle of the welding torch can be adjusted within $\pm 90^\circ$.

5. Control panel instructions



DynaSwing 100K control panel (image for reference only; the right to modify is reserved)

1. **“Welding / Non-welding” switch:** when the “welding” position is selected, the machine enters the welding preparation state; press the “Start” switch to proceed with welding. When the “Non-welding” position is selected and the “Start” switch is pressed, the trolley only moves and does not weld.
2. **“Start” switch:** when the switch is turned on, the trolley begins to move. If the “Welding / Non-welding” selector is in the “welding” position at that time, welding begins; if it is in the “Non-welding” position, only the trolley moves and no welding takes place.
3. **“Stop” switch:** if the stop switch is pressed while the trolley is moving, the trolley stops all actions.
4. **Travel direction selection switch:** the direction of travel can be selected as up or down.
5. **Walking speed:** the speed value is shown on the digital display, with a maximum travel speed of 1040 mm/min and a maximum displayed value of 999.
6. **Swing speed adjustment knob:** turning clockwise increases the swing speed to a maximum of 1520 mm/min. It is indicated by the scale, with a maximum scale value of 10.
7. **Swing amplitude adjustment knob:** turning clockwise increases the swing amplitude to a maximum of 20 mm. It is indicated by the scale, with a maximum scale value of 10.
8. **Left stop time adjustment knob:** the adjustment range is 0 to 2 seconds, increasing clockwise.
9. **Right stop time adjustment knob:** the adjustment range is 0 to 2 seconds, increasing clockwise.
10. **Centre movement adjustment knob:** turning clockwise moves the swing centre to the right; turning anticlockwise moves it to the left. The maximum range of movement is ± 5 mm.
11. **Swing mode selection knob:** use this knob to select the swing mode. The trolley has four swing modes.

6. Main technical parameters

Item		Content	Notes
Trolley	Power supply	AC 220 V, 50/60 Hz	
	External dimensions	500 × 355 × 243 mm	W × L × H
	Weight	10.6 kg	
	Drive mode	Rack drive	
	Walking speed	0 – 1040 mm/min	Digital display
	Torch adjustment — up and down	±20 mm	
	Torch adjustment — front and back	±20 mm	
	Operating angle	360°	
	Torch angle	±90°	
Rail	Installation form	Magnet, detachable	60 kg holding force
	External dimensions	42 × 29.3 × 1500 mm	W × H × L
	Material	Aluminium	
	Weight	6 kg	Including magnets
Swing parameters	Swing mode		Four selectable modes
	Swing speed	0 – 1520 mm/min	
	Swing amplitude	±20 mm	
	Left and right dwell time	0 – 2 s	
	Centre position	±5 mm	

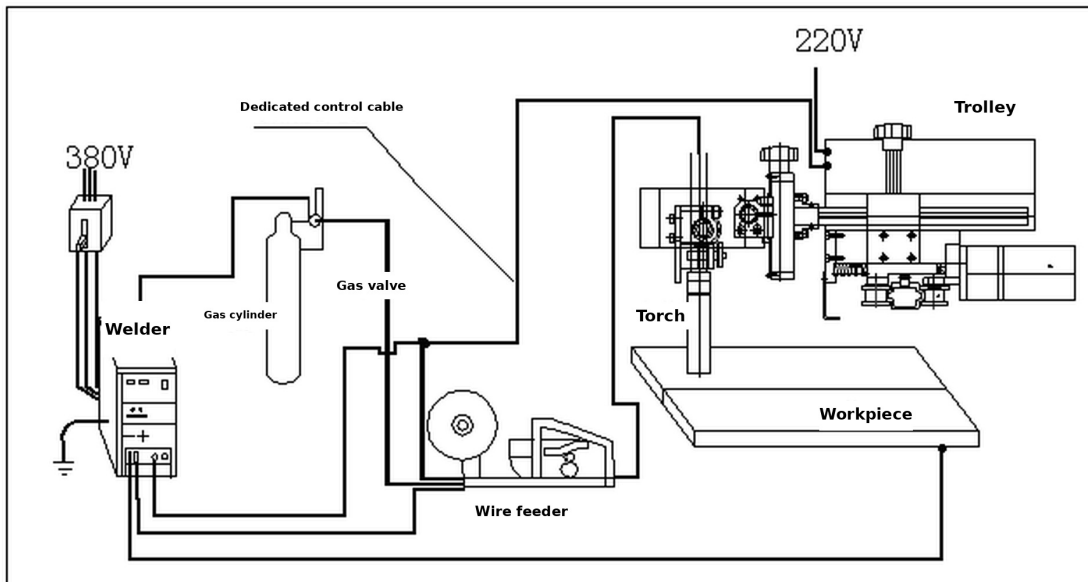
7. Installation method

(1) Installation conditions

- The necessary equipment for welding is the welding power source and the wire feeder.
- Power supply for travel and control (AC 220 V).
- CO₂ gas cylinders for welding.
- A CO₂ straight welding torch for automatic welding.
- Basic tools for the other necessary operations.

(2) System connection method

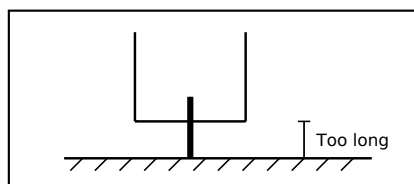
- Install the rail. The rail must be installed so that the welding direction of the trolley is parallel to the weld seam.
- Install the trolley, using the mounting handle to clamp the trolley's track wheels onto the rail.
- Install the wire on the wire feeding reel and pull it through to the end of the welding torch.
- Connect the end of the welding torch to the wire feeder.
- Connect one end of the trolley travel power cable to the trolley's 3P socket and the other end to the AC 220 V supply.
- The dedicated control cable has three connectors: one to the welding trolley, one to the welding machine, and one to the wire feeder.



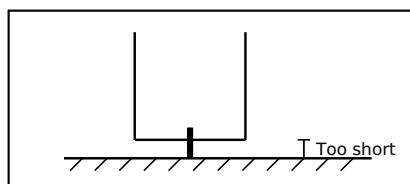
System connection diagram

8. Operating method

- Select the wire diameter switch on the welding power source.
- Select the type of wire on the welding power source: solid wire or flux-cored wire.
- Turn ON the power distribution board switch.
- Turn ON the welding power switch (the self-protection circuit switch of the welder is turned OFF).
- Open the valve of the CO₂ cylinder and check that the pressure is above 1 kg/cm². If the gas pressure is below 1 kg/cm², replace the cylinder. If it is above 1 kg/cm², set the gas switch of the welding power source to the "Check" position to adjust the gas flow. After adjusting the flow rate, set the "gas check" switch back to "OFF".
- Manually feed the wire to the front end of the welding torch and fit the contact tip that matches the wire diameter.
- Confirm the overhang (stick-out) length of the welding wire.

**Effect:**

- porosity is generated
- poor arc starting, unstable arc
- shallow penetration

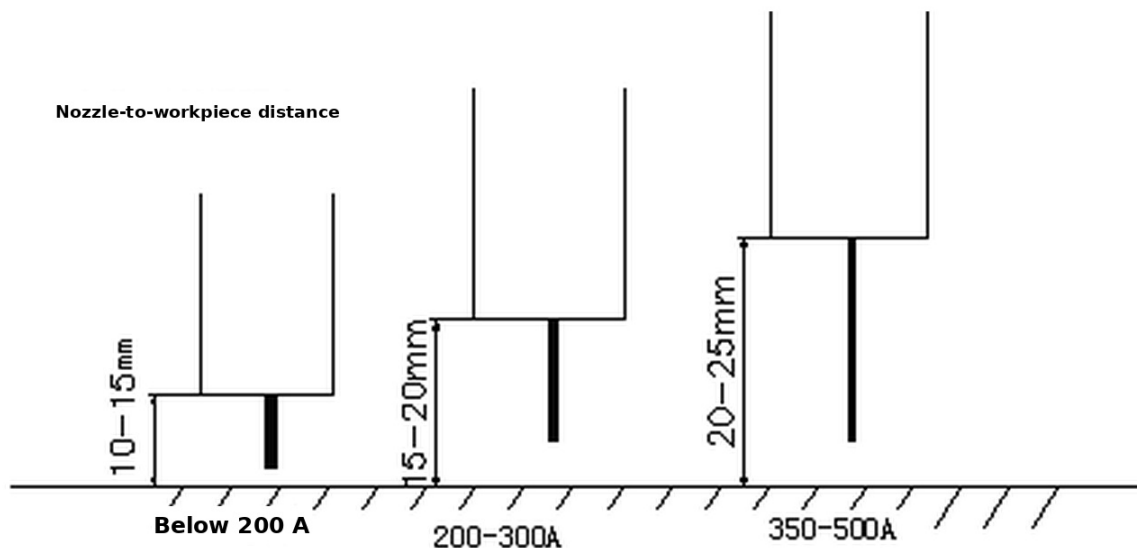
**Effect:**

- the nozzle is easily blocked by spatter
- the weld line cannot be seen clearly
- penetration becomes too deep

Effect of an excessive (left) and an insufficient (right) nozzle-to-workpiece distance

- Clamp the welding torch onto the torch holder and use the special wrench to adjust the operating angle and the travel angle of the welding torch.
- Adjust the X-Y slider; move the coarse adjustment knob of the torch position and set the position of the welding torch.
- Adjust the distance between the nozzle and the workpiece.

If the nozzle-to-workpiece distance is too large, defects (porosity, pits, etc.) are likely. Keep the spacing as shown below.



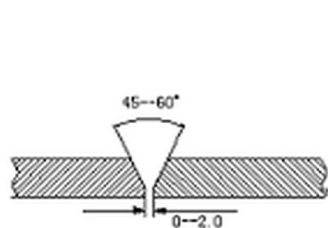
Recommended nozzle-to-workpiece distance for different welding currents

- Make the initial adjustment of the process parameters (current, voltage, etc.).
- Confirm the CO₂ gas flow rate and the protective effect on the molten pool.
- Make the initial adjustment of the required swing mode, swing amplitude, left and right dwell time, centre position and swing speed.
- Start welding, observe the arc, and adjust the travel speed, swing speed and the other parameters accurately. (Set the welding selector switch on the control panel to the welding position and press the start switch to begin welding.)
- Press the stop switch after the workpiece has been welded.

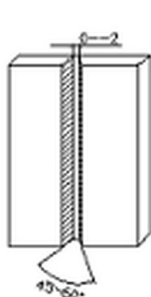
9. Welding process parameters (for reference only)

Welding parameters / wire diameter		φ1.2 mm	φ1.4 mm	φ1.6 mm
Current (A)	Flat welding	120 - 300	150 - 380	180 - 430
	Transverse welding	120 - 280	150 - 300	180 - 330
	Vertical up welding (overhead)	100 - 160	120 - 160	140 - 180
	Vertical down welding	120 - 170	140 - 180	150 - 200
Voltage (U)		① $U = 14 + 0.05 I$ ② below 300 A: $U = 0.04 I + 16 \pm 1.5$ above 300 A: $U = 0.04 I + 20 \pm 2.0$		
Distance (H) between the nozzle and the workpiece		Below 200 A: $H = 10 - 15$ mm 200 - 350 A: $H = 15 - 20$ mm 350 - 500 A: $H = 20 - 25$ mm		
Wire overhang length (L)		Generally about 10 times the wire diameter, that is $L = 10 d$		

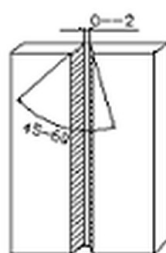
(1) Butt welding



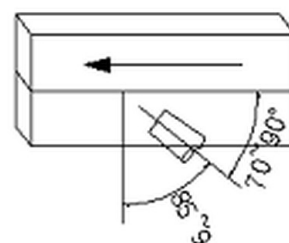
Flat butt weld



Vertical up welding



Vertical down welding



Horizontal welding

Plate thickness δ	Wire diameter	Root gap k	Current I	Voltage U	Speed V (cm/min)	Nozzle-to-workpiece spacing	Gas flow rate (L/min)
6 mm	1.2 mm	0 mm	270 - 300 A	27 - 30 V	60 - 70	10 - 15 mm	20
	1.2 mm	1.2 - 1.5 mm	200 - 230 A	24 - 25 V	30 - 35	10 - 15 mm	15 - 20
8 mm	1.2 mm	0 - 1.2 mm	300 - 350 A	30 - 35 V	30 - 40	15 - 20 mm	20
	1.6 mm	0 - 0.8 mm	380 - 420 A	37 - 38 V	40 - 50	15 - 20 mm	20
12 mm	1.6 mm	0 - 1.2 mm	420 - 480 A	38 - 41 V	50 - 60	20 - 25 mm	20

The corresponding swing parameters are:

Plate thickness δ	Swing mode	Swing amplitude (scale)	Swing speed (scale)	Left and right dwell time (s)
6 mm	Sawtooth wave	3 – 5	4 – 5	0.2 – 0.3
8 mm	Sawtooth wave	4 – 5	3 – 5	0.3 – 0.5
12 mm	Sawtooth wave	5 – 7	3 – 4	0.5 – 0.7

(2) Vertical up welding (overhead welding)

Plate thickness (mm)	Wire diameter (mm)	Current I (A)	Voltage U (V)	Walk speed (scale)	Gas flow rate (L/min)	Swing mode	Swing amplitude (scale)	Swing speed (scale)	Left / right dwell time (s)
6	1.2	100 – 120	18 – 20	40 – 50	12 – 15	Sawtooth	4	5	0.5
8	1.2	100 – 120	18 – 20	40 – 50	12 – 15	Sawtooth	4	5	0.5
12	1.2	120 – 160	20 – 22	55 – 60	13 – 15	Sawtooth	5	3	0.4

(3) Vertical down welding

Plate thickness (mm)	Wire diameter (mm)	Current I (A)	Voltage U (V)	Walk speed (scale)	Gas flow rate (L/min)	Swing mode	Swing amplitude (scale)	Swing speed (scale)	Left / right dwell time (s)
6	1.2	120 – 160	20 – 22	40 – 45	13 – 15	Sawtooth	3	5	0
8	1.2	120 – 160	20 – 22	40 – 45	13 – 15	Sawtooth	3	5	0
12	1.2	140 – 170	20 – 23	40 – 45	13 – 15	Sawtooth	4	5	0.4

10. Inspection and maintenance

To ensure the long-term safe use of the welding trolley, it must be inspected and maintained frequently and regularly.

1. Is there any dust?

- The control box and the torch position adjustment switches must be kept clean and wiped frequently; there should be no dust on them.

2. Is there any accumulation of dirt?

- Deposits should be removed from the contact tip, the torch head, the guide wheels and the slider areas, as they affect the safe operation of the trolley.

3. Are there any loose screws on the torch mount and the rails?

- Loose screws cause poor trolley movement and uneven weld seams; check frequently that the screws are tight.

4. Are any joints, connecting wires, hoses or welding torches broken or damaged?

- Check for loose joints and for broken or damaged connecting wires, hoses and welding torches.

5. Is there any abnormal noise or overheating?

- Regularly check the motor, the welding torch and the other components for abnormalities.

6. Is there any wear on the rack and pinion track?

- Wear on the rack causes poor travel and the rack should be replaced regularly.

7. Is the fuse blown?

- Check the fuse first if the power light does not come on after the machine has been wired up.

8. Is the swing working properly?

- Check the motor of the oscillator and all the adjustment knobs.

11. Faults and countermeasures

The faults of the CO₂ welding trolley and the corresponding countermeasures are as follows.

1) The power light in the control box does not come on

Cause	Repair measure
Poor contact of the control connecting wires	Replace the connecting wire
The fuse in the control box is blown	Replace the fuse
The 220 V power supply is switched off	Check and confirm the power supply

2) The welding start button does not work

Cause	Repair measure
Poor contact of the welding wire	Remove the welding slag
Faulty switch at the start of the weld	Inspect and replace the switch, or inspect and repair the wiring
Faulty drive unit	Inspect and repair the motor drive unit

3) The weld point of the welding torch does not match the target position

Cause	Repair measure
The welding torch holder is not aligned with the target position	Tighten the welding torch holder

4) The slider adjustment is not smooth

Cause	Repair measure
There is sediment in the slider area	Remove the deposits or add lubricating oil

5) The trolley stops during automatic welding

Cause	Repair measure
There is an obstacle on the trolley track	Remove the obstacle
There is sediment on the track wheel	Clean the track wheels

6) The welding stop switch is pressed but the welding arc is not extinguished

Cause	Repair measure
The welding stop switch has malfunctioned	Inspect and replace the switch
The self-protection circuit switch is in the "on" position	Set the self-protection circuit switch to the "none" position

7) The trolley does not travel along the vertical plane

Cause	Repair measure
The wheel position is not fixed properly	Reposition the wheels

8) The swing does not work properly

Cause	Repair measure
There is a problem with the swing motor	Check the motor, the wiring and the various adjustment knobs

If a fault persists, or is not listed above, stop work immediately and contact Cruxweld service.



Cruxweld Industrial Equipments Pvt. Ltd.

5, Sector 29, Faridabad – 121008 (Haryana), India

Phone: +91 8800 882 983 | +91 (129) 489 2868

Email: sales@cruxweld.com | Service: support@cruxweld.com

www.cruxweld.com

DynaSwing 100K — CO₂ Gas-Shielded Automatic Welding Trolley

The specifications and technical content of this product are subject to change without notice.