

ROVER™ TRACTOR

For use with machine Code: K60068-5 / Code No. 76306

Safety Depends on You

Lincoln arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** Most importantly, think before you act and be careful.



OPERATOR'S MANUAL



Copyright © 2017 The Shanghai Lincoln Electric Company



• World's Leader in Welding and Cutting •
THE SHANGHAI LINCOLN ELECTRIC CO.,LTD
No. 195, Lane 5008, Hu Tai Rd. Baoshan, Shanghai, PRC 201907
www.lincolnelectric.com.cn

Thank you for selecting QUALITY Lincoln Electric products.

- Please examine the packaging and equipment for damage. Claims for material damaged in shipment must be notified immediately to the authorized dealer from whom you purchased the machine.
- For future reference, please record your equipment identification information in the table below. Model Name, Code & Serial Number can be found on the machine rating plate.

Model Name	
ROVER™ TRACTOR	
Code & Serial number	
K60068-5	
Date & Where Purchased	
Authorized Dealer's Chop	

Declaration of conformity

THE SHANGHAI LINCOLN ELECTRIC CO., LTD

Designed in conformance with the following norm:

GB15579-5
EN 60974-5
EN 60974-10

THE SHANGHAI LINCOLN ELECTRIC CO.,LTD
No. 195, Lane 5008, Hu Tai Rd, Shanghai, PRC 201907

⚠ WARNING

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING EQUIPMENT.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.



ELECTRIC AND MAGNETIC FIELDS may be dangerous.

- 1.a Electric current flowing through any conductor causes localized Electric and Magnetic Field (EMF). Welding current creates EMF fields around welding cables and welding machines.
- 1.b EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- 1.c All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:
 - 1.c.1 Route the electrode and work cables together – Secure them with tape when possible.
 - 1.c.2 Never coil the electrode lead around your body.
 - 1.c.3 Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
 - 1.c.4 Connect the work cable to the workpiece as close as possible to the area being welded.



ARC RAYS can burn.

- 2.a Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc. Headshield and filter lens should conform to ANSI Z87.1 standards.
- 2.b Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 2.c Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



ELECTRIC SHOCK can kill.

- 3.a Electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- 3.b Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, grating or scaffolds, when in cramped positions such as sitting, kneeling or lying down, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- Semiautomatic DC Constant Voltage (Wire) Welder.
 - DC Manual (Stick) Welder.
 - AC Welder with Reduced Open Circuit Voltage.
- 3.c In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
 - 3.d Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
 - 3.e Ground the work or metal to be welded to a good electrical (earth) ground.
 - 3.f Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
 - 3.g Never dip the electrode in water for cooling.
 - 3.h Never simultaneously touch electrically “hot” parts of electrode holder to two welders because voltage between the two can be total of the open circuit voltage of both welders.



FUMES AND GASES can be dangerous.

- 4.a Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the welding fumes. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**
- 4.b Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- 4.c Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 4.d Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.



FOR ELECTRONICALLY powered equipment.

- 5.a Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- 5.b Install equipment in accordance with national standards, all local standards and the manufacturer's recommendations.
- 5.c Ground the equipment in accordance with the national standards and the manufacturer's recommendations.



WELDING SPARKS can cause fire or explosion.

- 6.a Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- 6.b When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- 6.c Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned".
- 6.d Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirts, cuffless trousers, high shoes and a cap over your hair.



CYLINDER may explode if damaged.

- 7.a Use only compressed gas cylinders containing the correct shielding gas for the process and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- 7.b Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.c Cylinders should be located:
 - Away from areas where they may be struck or subjected to physical damage.
 - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- 7.d Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

TECHNICAL SPECIFICATIONS---ROVER™ Tractor

INPUT VALUE		
ROVER™ TRACTOR	<u>Standard Voltage/Phase/Frequency</u> 110V AC(±10%)/1/50 or 60 Hz	<u>INPUT AMPERES</u> 2.6 A
RATED OUTPUT		
ROVER™ TRACTOR	<u>DUTY CYCLE</u> 60% 100%	<u>AMPERES</u> 1200 A 1000 A
RATED VALUE		
<u>WIRE DIAMETER</u> 2.4 ~ 4.8 mm	<u>WIRE FEED RATE</u> 15 ~ 150 m/h	<u>TRAVEL SPEED RANGE</u> 6 ~ 72 m/h

PHYSICAL DIMENSIONS				
ROVER™ TRACTOR	<u>DEPTH</u> 1080 mm	<u>WIDTH</u> 480 mm	<u>HEIGHT</u> 740 mm	<u>WEIGHT</u> 55 Kg (W/O wire)

TEMPERATURE RANGES	
<u>Operating temperature</u> -40°C ~ +40°C	<u>Storage temperature</u> -40°C ~ +55°C

OTHER PARAMETERS	
Adjustable height of cross beam	70mm
Adjustable distance of tractor head	100mm×100mm×70mm (up and down、left and right、front and back)
Rotatable angle of cross beam around vertical column	±90°
Tractor head inclination	±45°
Torch inclination	±45°
Flux container volume	6L
inner diameter of wire spool	φ300
Wire spool capacity	25kg

For any maintenance or repair operation it is recommended to contact the nearest technical service center or directly consult the machine division of the Shanghai Lincoln Electric Co. Ltd.. Maintenance or repairs performed by unauthorized service centers or personnel will void the manufacturer's warranty.

SAFETY PRECAUTIONS

Read the entire installation section before starting installation.



WARNING



- Electric shock can kill
- Only qualified personnel should install this machine
- Turn the input power OFF at the disconnect switch of fuse box before installing or

working on the equipment

- Do not touch electrically hot parts.

SELECT SUITABLE LOCATION

This power source should not be subjected to rain, nor should any parts of it be submerged in water. Doing so may cause improper operation as well as pose a safety hazard. The best practice is to keep the machine in a dry, sheltered area.



CAUTION

The bottom of machine must always be placed on a firm, secure, level surface. There is a danger of the machine toppling over if this precaution is not taken.

Place the welder where clean cool air can freely circulate in through the side and back louvers and out through the case bottom. Water dust or any foreign material that can be drawn into the welder should be kept at minimum. Failure to observe these precautions can result in excessive operating temperatures and

nuisance shutdowns.

Locate the ROVER™ machine away from radio controlled machinery. Normal operation of the welder may adversely affect the operation of RF controlled equipment, which may result in bodily injury or damage to the equipment.

STACKING

ROVER™ can't be stacked.

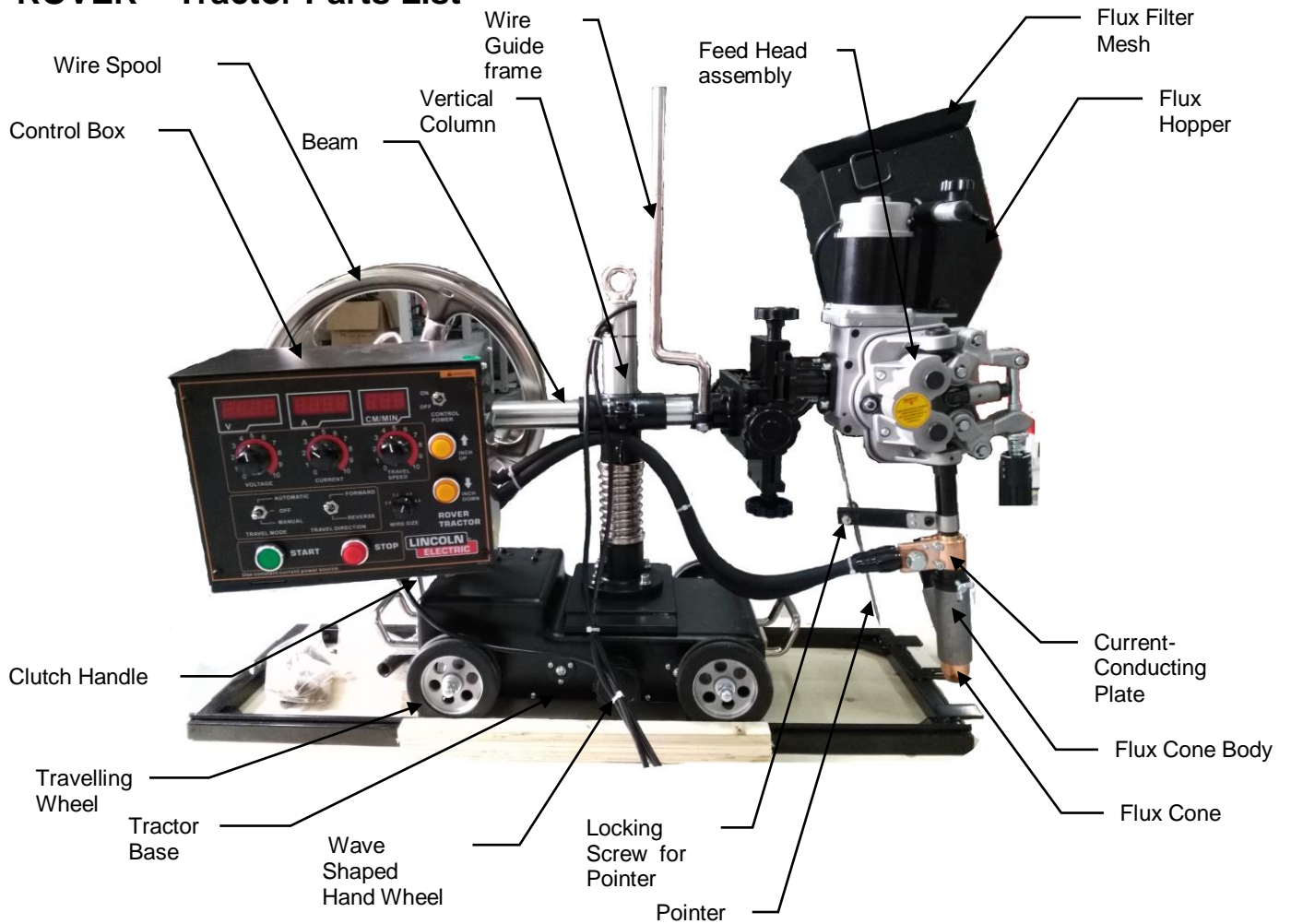
WELDING CABLE AND CONTROL CABLE CONNECTION



WARNING

Only a qualified electrician should connect the input leads to the ROVER™. Please use Lincoln electric offered quality control cable to connect to power source with ROVER™. If you don't use qualified control cable as Shanghai Lincoln Electric standard, it will effect machine performance and body injury.

ROVER™ Tractor Parts List




Additional Information

- ▲ The tractor is composed of tractor base, vertical column, rotary part of the cross beam, base plate hand wheel, wire feeder reductor, tractor head bracket assembly, flux hopper assembly, wire spool assembly and control box;

Acceptance of packing

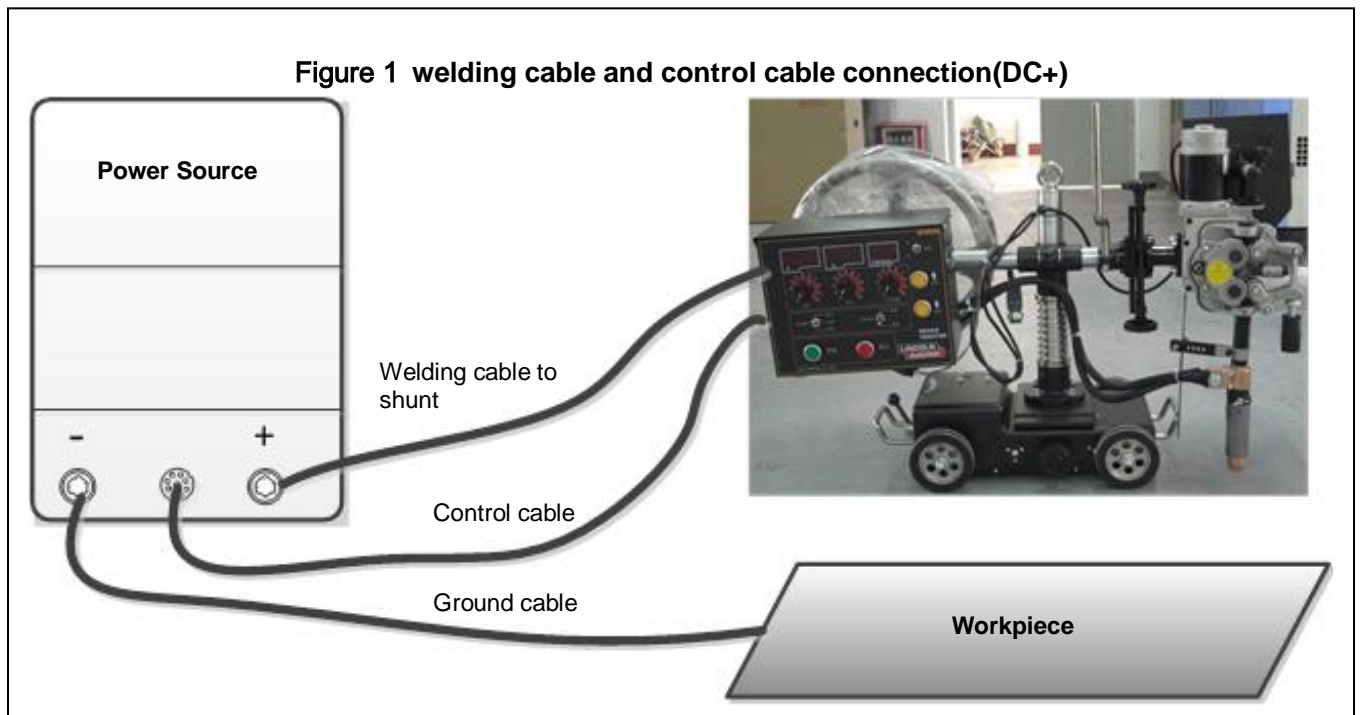
- Please check whether the package is damaged when you receive the goods.
- Please open the package for inspecting and accepting the tractor, the specification and quality of the tractor and the accessory is as below. SEE 《ROVER™ Tractor Packing List》

ROVER™ Tractor Packing List

Standard Accessory			
			
Note: the right size of wire feeder drive roll and contact tip is as below.			
Name	Size	QTY	Note
Drive roll	$\Phi 3/\Phi 4$ * $\Phi 4.2/\Phi 5$	2 each	Including the original two
Contact tip	$\Phi 3$ 、 $\Phi 4$ *、 $\Phi 5$	1	Including the original one
Special tube spanner		1	For rotating the angle of the bracket
Dual head wrench	14x17	1	For adjusting the position of the tractor head
Fuse	4A 250V	2	

* : Defaulted parts on the tractor.

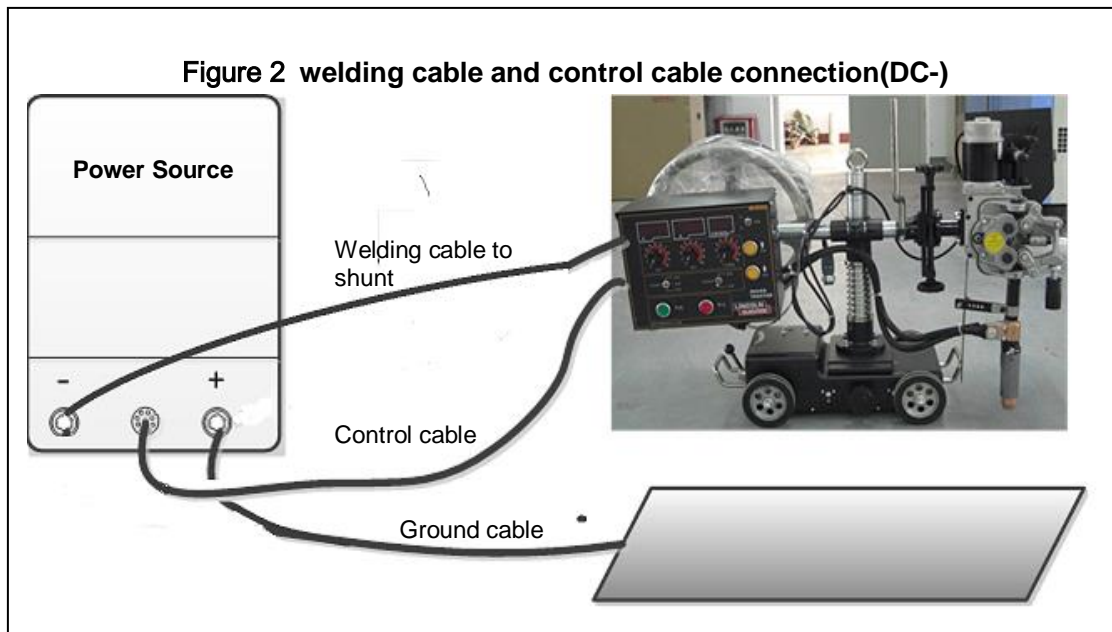
ROVER™ Tractor Connection Diagram



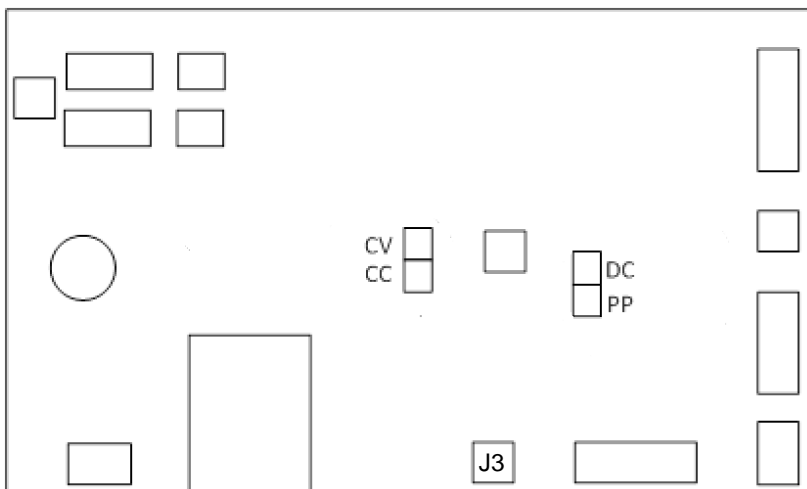
- Turn off ROVER™ Tractor.
- Turn off power source, connect welding cable and control cable as Figure 1. The control cable uses lincoln standard 9 pin connector, it's compatible with LT-7™ Tractor connector .
- Please make sure the output toggle switch is on CC mode.
- Choose sufficient size of welding cable according to your welding parameter. If your do not use suitable size welding cable, it will effect your welding quality. If the welding

- cable is too thin, maybe it will cause fire.
- For safety and welding quality reason, please make sure all the connections are tightly metal-to-metal electrical contacted. If not, it will injury output stud and affect welding performance.

⚠ warning

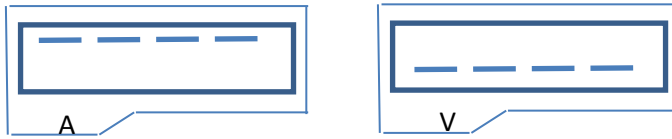


- Turn off ROVER™ Tractor and the power source.
- Connect welding cable and control cable as Figure 2. Set the polarity switch at “-” on power source.
- Open the control box, pull out the J3 plug (white wire), and plug in the grey wire one.
-



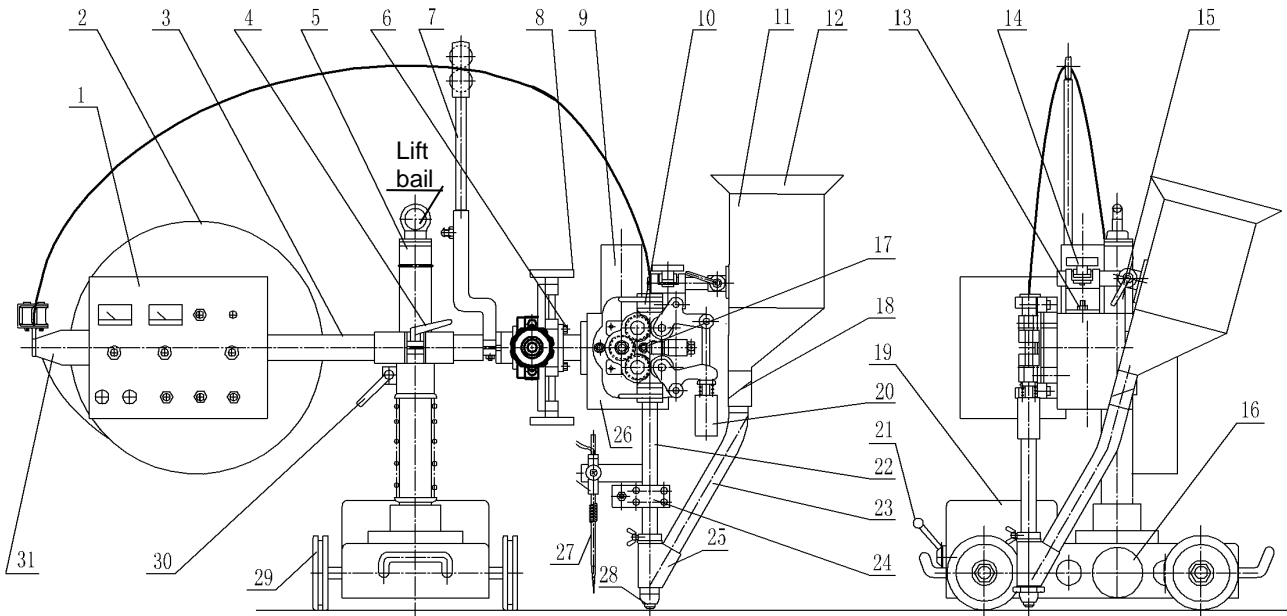
Note. The two steps above should be recovered, when go back to DC+ welding mode.

- Press “INCH UP” & “INCH DOWN” buttons and then power on the tractor. Press the “INCH UP” four times, and “INCH DOWN” four times. Let the display window show like below, to enter the **parameter setting mode**.



- Push “STOP” button, let the right side display window show “E”, to enter into edit mode. Push “INCH DOWN” button to select the weld polarity (0=DC+; 1=DC-), then restart the tractor.
- Select the right size welding cable according the welding process.

Construction of the tractor and function of various components.




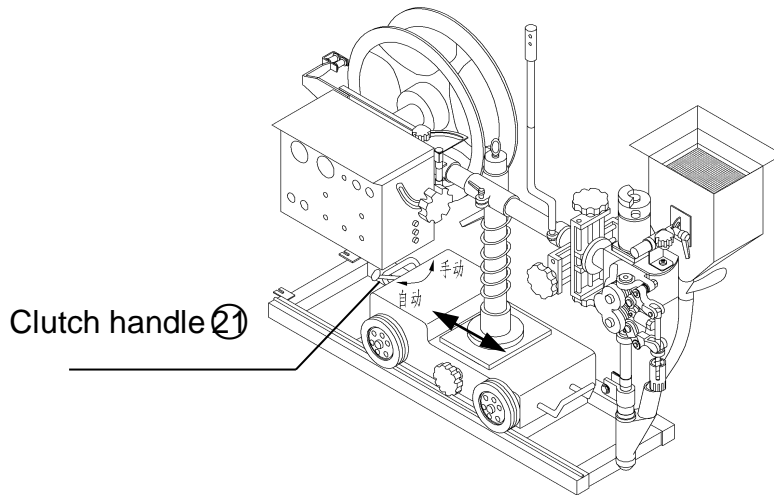
- 1.Control box 2.Wire spool 3.Cross beam 4.Adjustable tightening screw(1) 5.Vertical column 6. M8 Hexagonal stud 7.Wire guide frame 8.Feed head adjustment hand wheel 9.wire feeding motor 10.Feeder head bracket assembly 11.Flux hopper 12.Flux filter mesh 13. M8 hexagonal nut 14.Star shaped hand wheel 15.Adjustable tightening handle 16.Wave shaped hand wheel 17.Straightening wheel 18.Flux shutter 19.tractor base 20.Pressuer regulation knob 21.Clutch handle 22.Torch bar 23.Rubber flux hose 24.Conducting plate 25.Triangle flux container 26.Wire feeder reductor 27.Indicator 28.Flux exit tube 29.Travelling wheel 30. Adjustable tightening screw(2) 31.Drawing frame of the wire spool

■ Function of the parts

▲ Travel of the tractor

- The tractor will travel automatically by moving the clutch handle (21) to “auto” shift (closing the clutch), the tractor will stop travelling by moving the clutch handle (21) to “manual” shift (releasing the clutch) and it can be pushed forward or backward manually.

 Attention	<ul style="list-style-type: none"> ● The surface for the tractor working on should be even, paint residue, iron scrap and rubbish should be cleared away. ● The rail should be parallel to the workpiece.
---	---



▲ **Movement of the vertical column**

● The vertical column can be moved for 70mm by rotating the wave-shaped hand wheel ⑩ ;

▲ **Up and down of the cross beam**

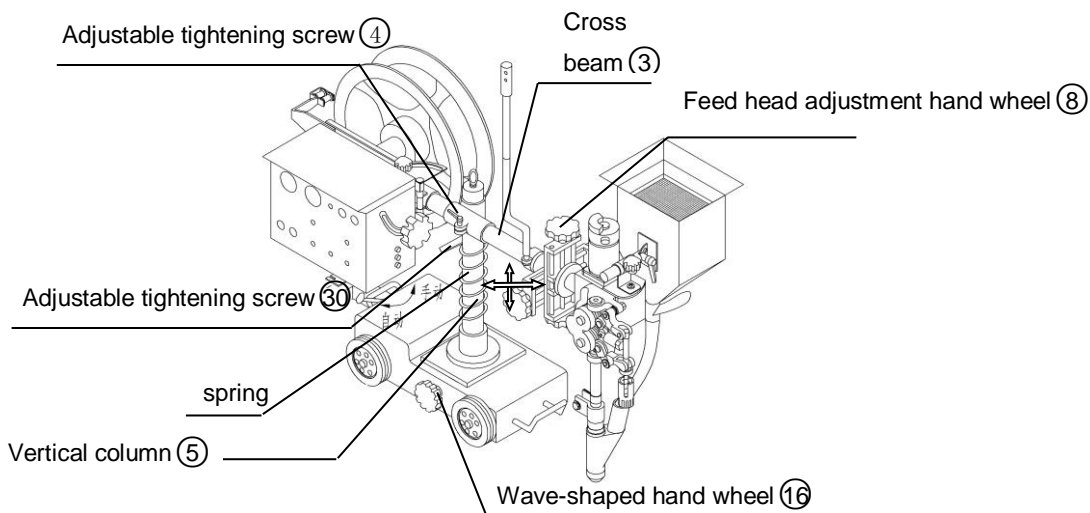
● The cross beam can move upward relying on the spring force itself or downward by pressing down spring for 70mm when loosening the adjustable tightening screw(2) ⑩

▲ **Position adjustment of the tractor feed head**

● The tractor feed head can be moved upward/downward or leftward/rightward for 100mm by rotating the Feed head adjustment hand wheel ⑧

▲ **Transversal movement of the tractor head**

● The tractor can move together with the cross beam transversally for 100mm by loosening the adjustable tightening screw ④



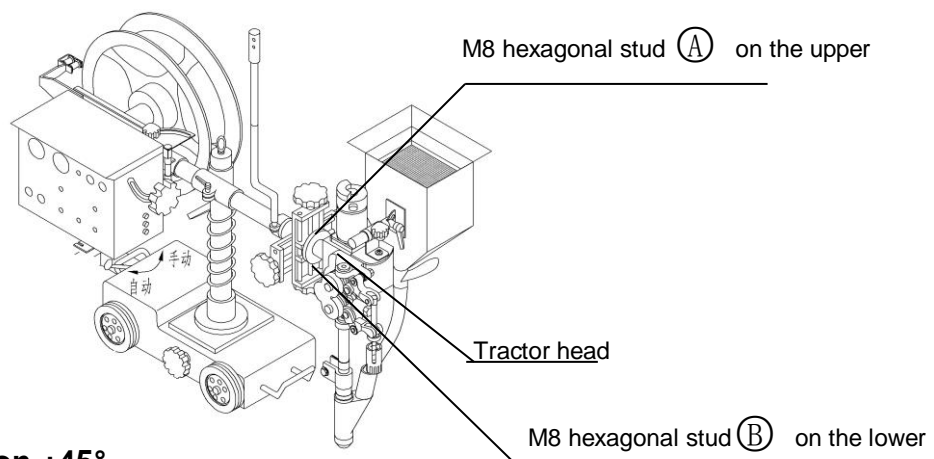
▲ The rotatable angle of the cross beam around vertical column is $\pm 90^\circ$

● The cross beam can rotate around vertical column (5) $\pm 90^\circ$ by loosening the adjustable tightening handle (2) (30)

▲ Tractor head inclination $\pm 45^\circ$

● The tractor head can rotate $\pm 45^\circ$ by loosening that M8 hexagonal stud on the upper part of the rotary disk of the Feed head adjustment hand wheel (8).

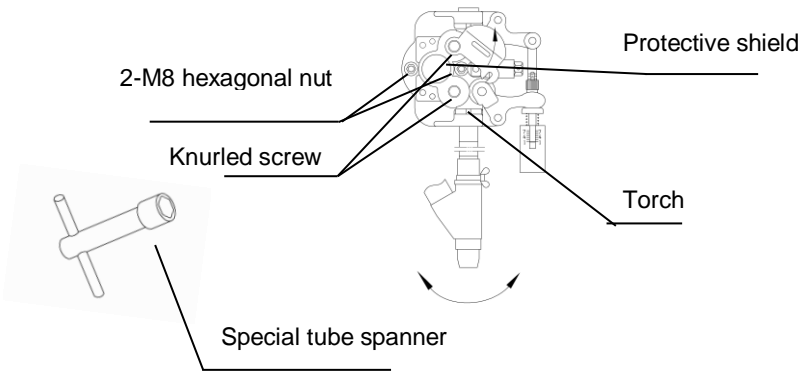
(Another M8 hexagonal stud on the lower part of the rotary disk of the base plate has been pre-set, there is no need to make any adjustment.)



▲ Torch inclination $\pm 45^\circ$

● The tractor head bracket assembly can rotate together with the torch for $\pm 45^\circ$ by loosening the 2 knurled screw (no need to disassemble) on the tractor head bracket

assembly, moving away protective shield, loosening 2 M8 hexagonal nut on the tractor head bracket assembly with the special tube spanner. When the desired angle is rotated to the position, restore the protective shield to it's original position and tighten the 2 knurled screw.



Important reminder !

The dust in the interface between the tractor head bracket assembly and the wire feed reductor has to be cleared, otherwise, the dust may enter into the wire feeder reductor from the screw holes during the rotation of the tractor head bracket assembly and the torch, which will result in the wearing of the gears and other parts of the reductor.

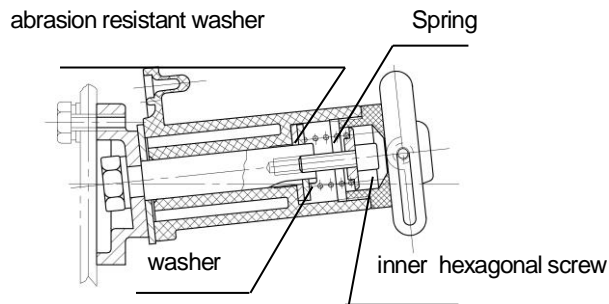
▲ Adjustment of the damping of the wire reel

shaft

- The damping force has been preset. In case adjustment is made, please follow the following procedures.

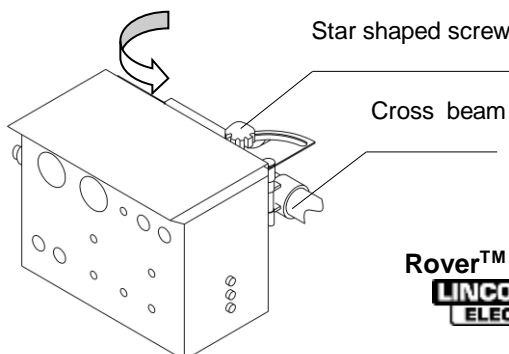
① move the cap → ② tighten the inner hexagonal screw to increase damping, loosen the hexagonal screw to reduce damping → ③ re-load the cap.

- ▲ Tighten the inner hexagonal screw to increase damping
- ▲ Loosen the inner hexagonal screw to reduce damping



▲ Rotatable angle of the control box

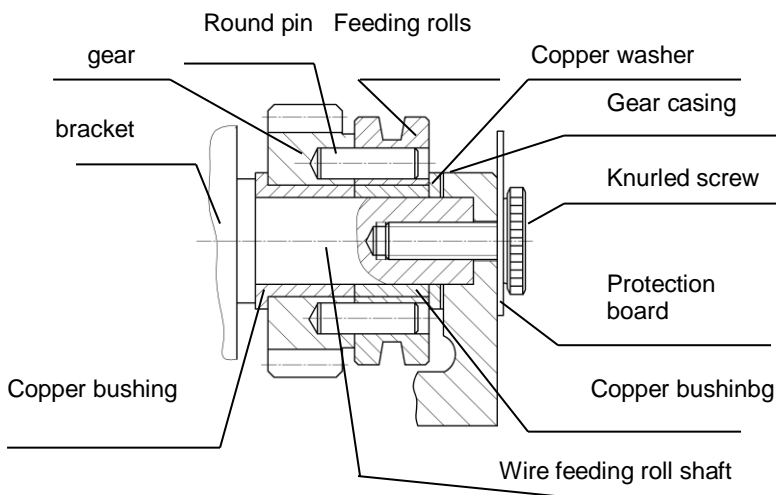
- The control box can be rotated horizontally by loosening the star shaped screw on the top of the control box.



Preparation Before Welding

■ Please operate the tractor after connecting it to the power source according to following procedures.

- Clear the welding area, clean away sundries such as rubbish, oil and dirty.
- Please make sure the rail is at same level as the work-piece or parallel.
- Please check and make sure that the driver roll is suitable for the wire size at the end.



Important reminder !

- When replacing the wire feeder rollers, please make sure that the two wire feeder grooves are at the same specification and wipe away the dust on the wire feeder axis, use the lubrication grease to prolong the service life of the wire feeder rolls.
- Please add one copper washer each on the front and back axis after the wire feeder rolls are installed.
- After the wire feeder rolls are replaced, be sure to close the gear casing and the protective shield, tighten the 2 knurled screws to make the interface between the gear casing and wire feeding bracket assembled tightly. The gear casing serves as both the protective casing and the brace for the wire feeder axis, it must be re-loaded after dissembled.
- The thickness of the copper washer must be strictly observed to prevent bad results.

Procedures to load wire feeder rolls:

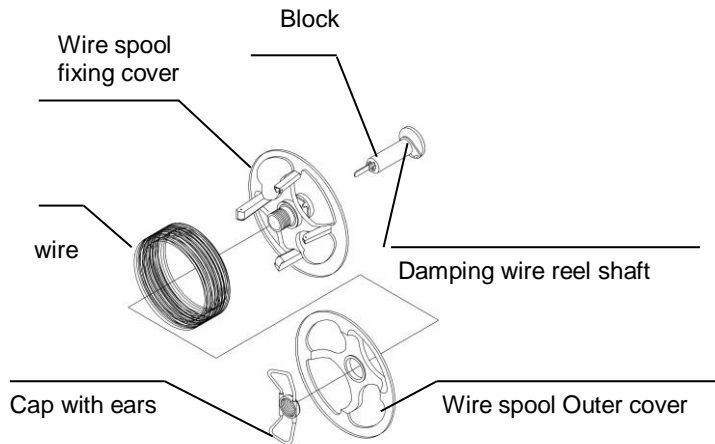
Remove knurled screw → automatic push-out of the protective shield and gear casing → take off copper washer → remove wire feeder roll → check the specification of the wire feeder roll → clear dust from the wire feeder axis and apply some lubrication grease → load the 2 rolls of the same specification with the wires → re-load copper washer → close the gear casing → load the protective shield → tightening knurled screw.

● Load wires

1. Pull out and push down the block of the damping wire reel shaft;
2. Take off the wire spool;
3. Unscrew the cap with ears;
4. Take off the wire spool fixing cover
5. Load the wires into the wire spool fixing cover;
6. Put on wire spool out coverer

7. Screw in the cap with ears; 8. Re-load the wire spool; 9. Restore the block to its original position

■ **As to how to adjust the damping force, please refer to the adjustment of the damping of the wire reel shaft**

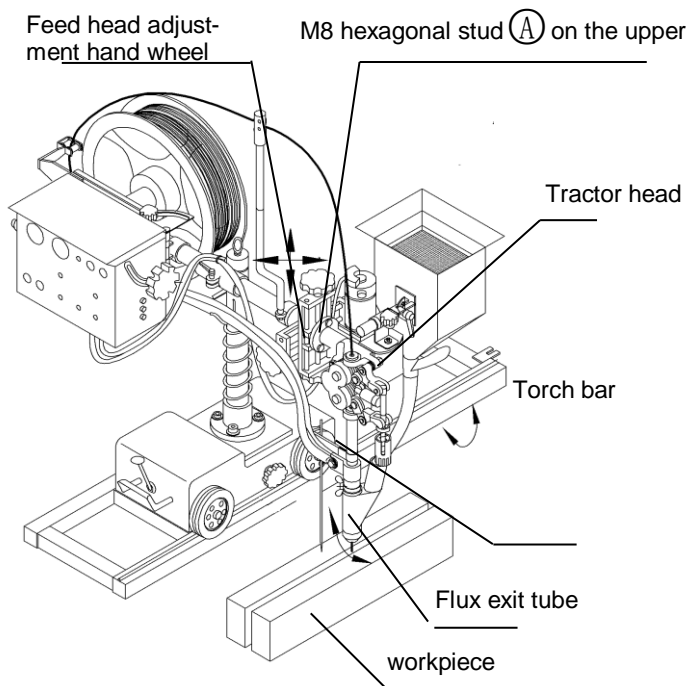


Important reminder!

The block of the damping wire spool shaft has to be returned to its original position to prevent wire spool from falling off.

■ **Primary adjustment of the tractor head position**

- ▲ Adjust the Feed head adjustment hand wheel to move the torch to the weld seam
- ▲ When rotating the tractor head, please refer to tractor head inclination $\pm 45^\circ$ - PAGE A-9
- ▲ When deflecting the torch, please refer to torch inclination $\pm 45^\circ$ - PAGE A-9



Important reminding !

In case to adjust the angle of the tractor head, loosen that M8 hexagonal stud (A) on the upper of the rotary disk of the base plate. Please hold the tractor head when doing so to prevent the tractor head from falling over due to its own weight and damaging the flux exit tube.

Important reminding !

The dust in the interface between the tractor head bracket assembly and the wire feeder reductor has to be cleared when deflecting the torch, otherwise, the dust may enter into the wire feeder reductor from the screw holes during the rotation of the tractor head bracket assembly which will result in the wearing of the gears and other parts of the reductor.

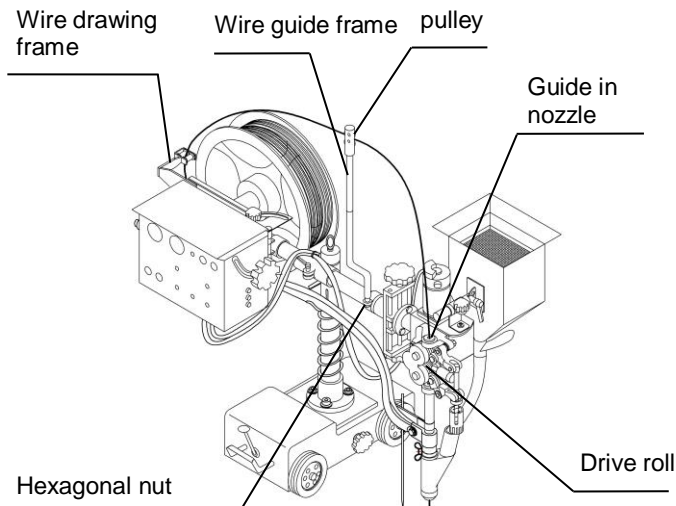


Attention

The torch inclination should be no more than $\pm 45^\circ$, in case the angle is too big, the feeding angle of the wire will be changed and there will be more obstruction to affect the feeding results and it may burn feeding motor in worst case.

▲ Adjusting the position of the wire guide frame

- Draw out wires from the wire spool and guide it all the way to feeding roller through the wire guide frame, pulley and guide in nozzle. Tighten the hexagonal screw to fix the wire guide frame after proper adjusting.



Warning

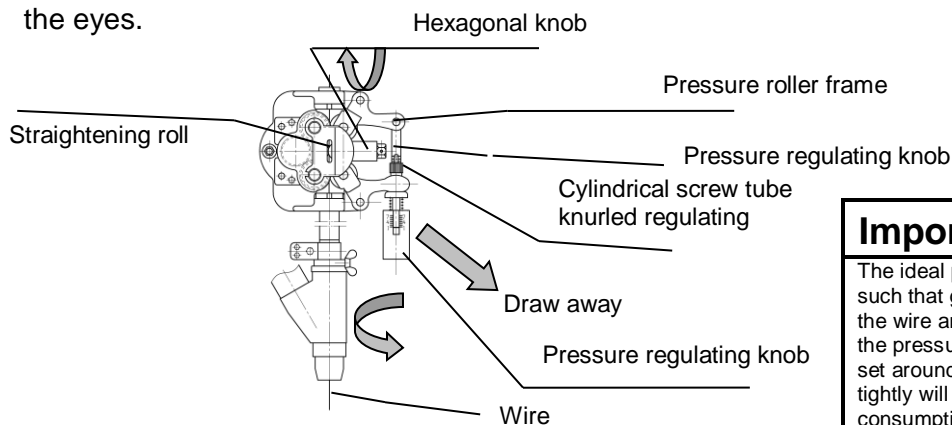
- Do not wear glove when guiding or replacing the wires
- Do not touch the gears when in rotating

▲ Press down wires tightly

- There is adjusting screw knurled tube on the pressure regulating handle with symbols 3,4,5 on it. The symbols 3,4,5 show the positions that the cap is to be adjusted to for wire diameters $\Phi 3$, $\Phi 4$ and $\Phi 5$ accordingly. Please regulate the cap to its proper position so that the pressure regulating arm can be pushed easily.
- Pressure regulating knob: tighten the knob clockwise to increase the tightening force, anticlockwise to reduce the tightening force.

▲ Regulating the straightening roller to straighten the wires

- Release the pressure regulating knob, rotate the hexagonal knob, push in the straightening roller, press down the manual feeding button to make the straightening roller press tightly on the wires to start the feeding process. Close the pressure regulating knob and continue rotating hexagonal knob until the straightness of the wires meets the welding requirement measured by the eyes.



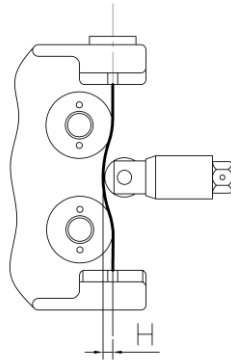
Important reminding !

The ideal pressure on the wire should be such that guarantees normal feeding of the wire and makes no slip. The scale of the pressure regulating knob should be set around 2-3, pressuring wires too tightly will increase the power consumption of the motor.

▲ Reference value of the straightness of the wire

The straightness of the wire sticking out within 100mm after straightening should be no more than 2.5mm. Please refer to the following chart.

Straightness reference value	
Spec	Reference value H
Φ6	1.3
Φ5	1.0
Φ4	0.6
Φ3	0.4

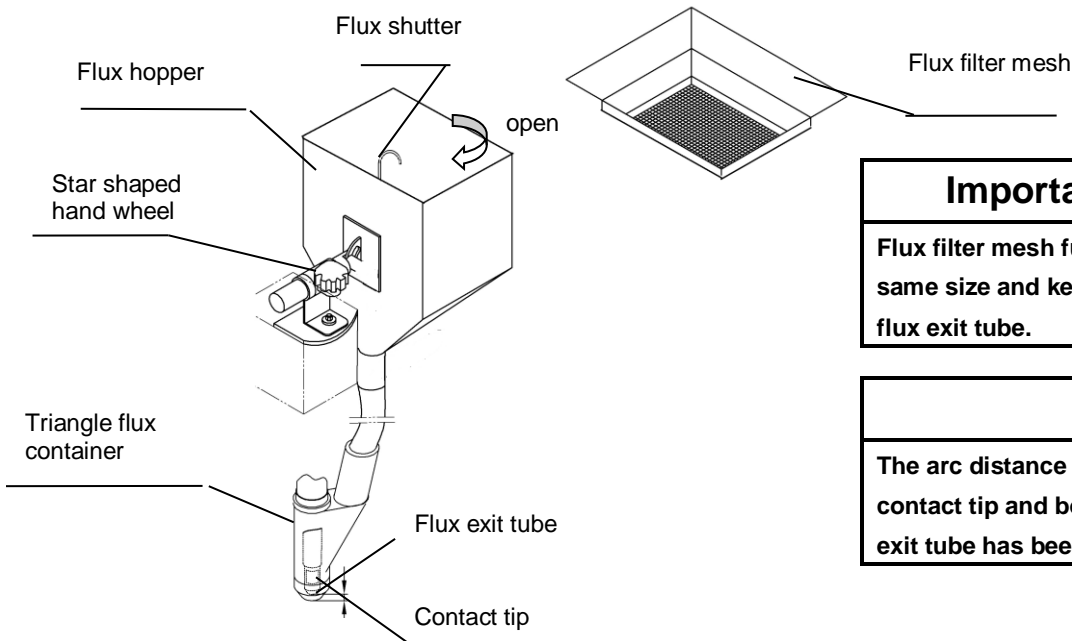


Important reminding!

Over-straightening of the wires will cause wires to bend in opposite direction!

▲ Check the position and angle of the flux hopper

- Release the star shaped hand wheel to adjust the position of the flux hopper.
- Release the adjustable tightening handle to adjust the angle of the flux hopper.
- Adjust the position and the angle of the triangle flux container to make it suitable for that of the flux hopper, which will ensure smooth flux exit.
- Adjust flux container switch to make flux barely cover the contact tip and the weld seam, the welding speed could be adjusted by eye measurement.



Important reminding!

Flux filter mesh function is keep the flux all same size and keep the flux easy through flux exit tube.

Note

The arc distance of 5-10mm between the contact tip and bottom surface of the flux exit tube has been set before ex-works.

▲ Set welding current, voltage and speed

- The welding current, voltage and speed is pre-set accordingly to the thickness of the work piece and welding process requirement.

▲ Press down the power button to light the indication lamp and power on the tractor

- Move the manual/automatic shift to manual to start feeding the wires manually, letting wires go through the torch bar and into the contact tip for the pre-set length.

■ Minor adjustment of the position of the tractor head



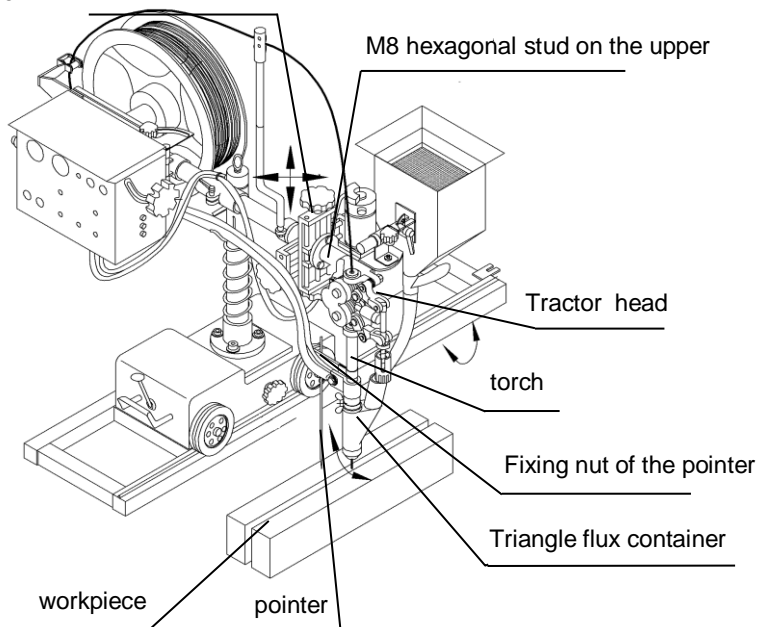
▲ Minor adjust the welding wire to the middle of the weld seam

- Observe whether the welding wire is positioned to the middle of the weld seam, rotate the Feed head adjustment hand wheel until it is adjusted to the desired position.

▲ Adjust the pointer to point at the weld seam

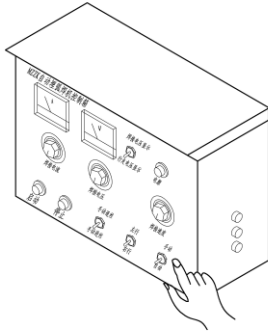
- After the minor adjustment, the position of the welding torch and the weld seam have been set, release the fixing nut of the indicator to adjust it's position 10-15mm higher than that of the work piece, trigger the indicator to point at the weld seam and tighten the fixing nut again.

Feed head adjustment hand wheel



■ Start to weld

▲ Move the “manual/automatic” shift to “automatic” and press the “start” button until the arc is ignited to start the welding.

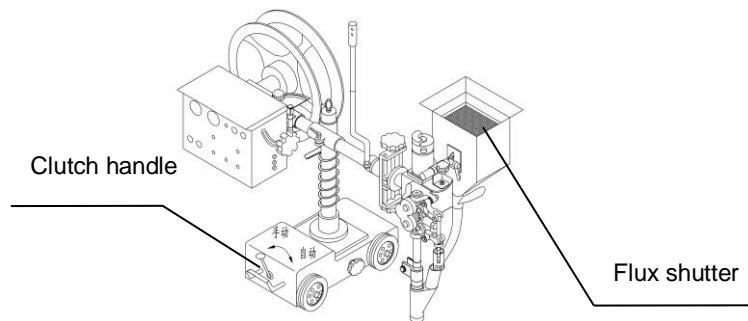


Important reminding !

Observe whether the indicator is to the middle of the weld seam during welding process and make adjustment immediately in case of deflection.

▲ Power offer when the welding is finished

● Push the “stop” button to end the welding when the torch reaches the end of the weld seam. Close the shutter of the flux hopper and power off. Move the clutch handle on the tractor base to “manual” and drag the tractor out of the welding area.



Motor and welding current collecting connection illustrated.

Detail information, see **Figure 2** and **Figure 3**

Control cable port illustrated

Detail information, see **Figure 4** and **A.1**

DC1000 control out stud see **Figure 5**

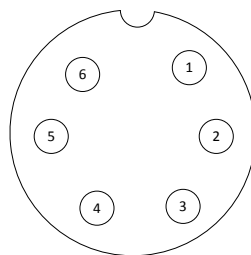


Figure 2 motor and welding current collecting socket (under control box)

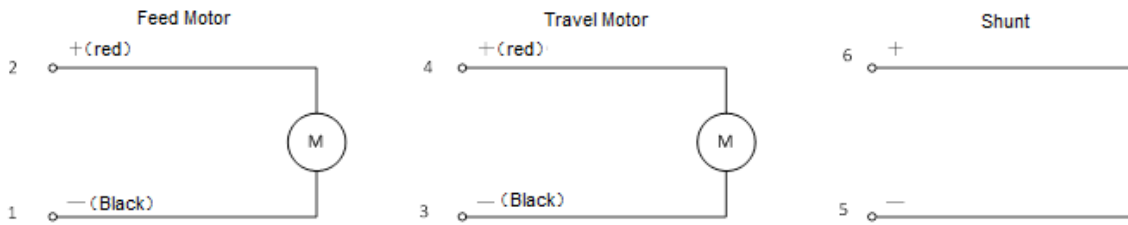


Figure 3 Electrical Connection

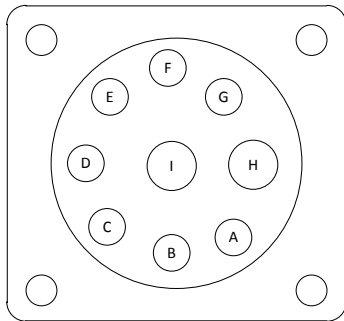


Figure 4 Control Cable 9 Pin Connector (left of control box)

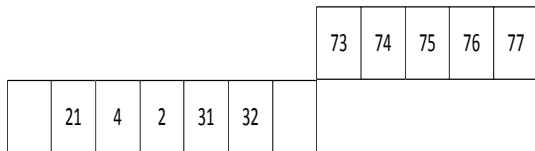


Figure 5 DC1000 Terminal Strip

Figure A.1 9pin control cable terminal strip

Welding Tractor			DC1000		Power Source	
Pin	Function	Wire colour #	Terminal Number	Pin	Function	Wire colour #
B	start /stop signal	White 1	4	D	start /stop signal	White 1
A		White 2	2	C		White 2
D	110V AC	Black 1	32	A	110V AC	Black 1
C	110V AC	Black 2	31	J	110V AC	Black 2
I	GND	White 3	GND	B	GND	White 3
E	workpiece	White 4	21	H	workpiece	White 4
F	Output control (small)	White 5	75	G	Output control (small)	White 5
G	Output control (stud)	White 6	76	F	Output control (stud)	White 6
H	Output control (large)	White 7	77	E	Output control (large)	White 7

CONTROL FUNCTION

Front Panel (Please see figure B.1)

1. ON/OFF SWITCH

Control the power source ON/OFF

ON

ROVER™ tractor is ready to start working.

OFF

ROVER™ tractor will be out of power.

2. LED Meter

Display preset and actual welding parameter.

Preset CC mode:

Preset mode, display preset voltage.

Welding mode, display actual welding voltage

Preset CV mode:

Preset mode, display preset WFS.

Welding mode, display actual welding current

3. LED Meter

Display preset and actual welding parameter.

Preset CC mode:

Preset mode, display preset welding current.

Welding mode, display actual welding current

Preset CV mode:

Preset mode, display preset welding voltage.

Welding mode, display actual welding voltage

4. LED Meter

Display ROVER™ tractor travel speed meter

5. Control knob

Preset CC mode:

Preset mode, display preset voltage.

Welding mode, display actual welding voltage

Preset CV mode:

Preset mode, display preset WFS.

Welding mode, display actual welding currents

Note: Press "INCH UP" & "INCH DOWN" can see the preset current

6. Welding current control

Preset CC mode:

Preset mode, display preset welding current.

Welding mode, display actual welding current

Preset CV mode:

Preset mode, display preset welding voltage.

Welding mode, display actual welding voltage

7. Control travel speed

Preset and adjust travel speed.

8. Travel mode

Control travel mode.

Automatic

When the operator push start button and the ROVER™ tractor detect have a stable arc, the ROVER™ will move according to preset travel speed.

Off

ROVER™ tractor will stop.

Manually operation

When the toggle switch is on manually operation, you can move the ROVER™ tractor. The other way is thought the clutch handle on/off to move ROVER™ tractor. You can control the travel direction through the travel direction toggle switch.

9. Travel Direction Switch

Control the direction of ROVER™ tractor.

Forward

ROVER™ tractor goes forward

Backward

ROVER™ tractor goes backward

10. Start Button

Push the start button, the power source is ready to output and the wire feeder motor starts to run. ROVER™ tractor travels according to the setting of the travel direction switch. The wire feed speed is controlled by the pre-set.

11. Stop button

Push the stop button, welding process into crater procedure. At the end of crater procedure, power source stops output and wire feeder motor stops running.

12. Inch Up

Retract the wire from the feed mechanism. It's invalid at welding mode.

13. Inch Down

Feed the wire down towards the work piece. It's invalid at welding mode.

14. Wire Diameter Knob

Turn the knob, can choose the wire diameter 2.4mm, 3.2mm, 4.0mm, 4.8mm.

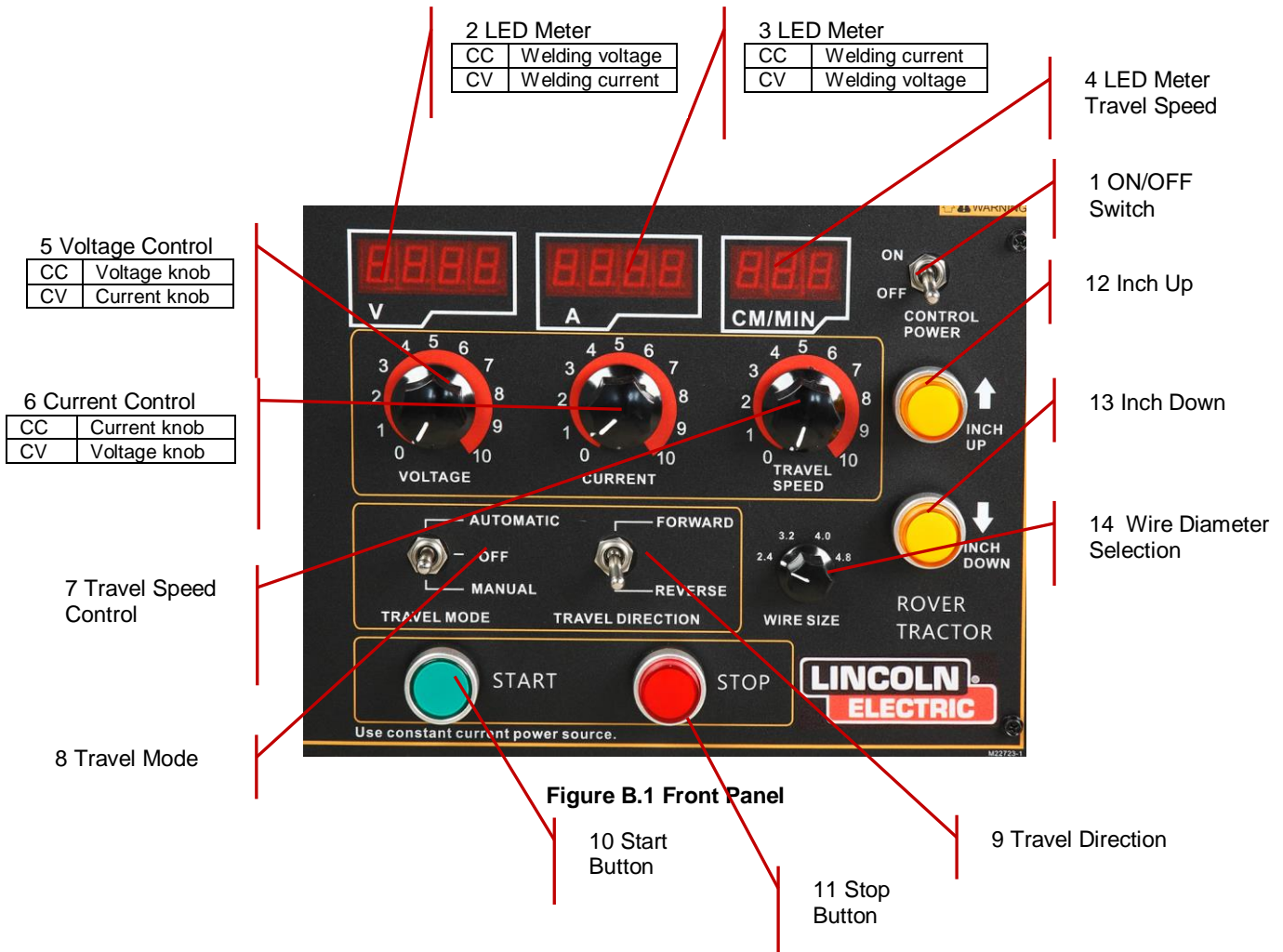


Figure B.1 Front Panel

Preset parameter

The ROVER™ tractor have preset parameter function. When the switch is at on position, you can preset welding voltage, welding current and travel speed.

Choose wire diameter

The ROVER™ tractor has wire diameter selection function. Turn the wire diameter knob you can choose the wire diameter of 2.4mm、3.2mm、4.0mm、4.8mm. When you select the wire size, the welding program will be correponded according to your selected parameters. Different wire diamater choose is related to different welding parameter. So for getting good welding performance, you need to choose right wire diameter.

Touch sense function

The ROVER™ tractor has touch sense function.

When push inch down button and wire strike to work piece, the wire feeding is automatically stopped.

Fixed point start function

The ROVER™ tractor has fixed point start function.

When the ROVER™ tractor detect to get stable arc then tractor will move, the function can let operator to see the precise bead position.

Power source selection

The ROVER™ tractor can match with Lincoln (US) DC-1000 and POWERPLUS™ 1000HD power sources.

The selection switch is in the control box (see figure 6, S2). Up position (DC) can match with DC-1000; Down position (PP) can match with POWERPLUS™ 1000HD.

Please choose the right position (Up or Down) according to the power source style and if you get wrong position, it will effect welding performance.

Please turn off power source then operation.

figure 6, S1). Up position (CV) can make tractor work in CV mode; Down position(CC) can make tractor work in CC mode.(When used on CV mode, please use the CV panel plate.)

Please turn off power source then operation.

Power source selection

The ROVER™ tractor can work in CC and CV mode.

The selection switch is in the control box (see

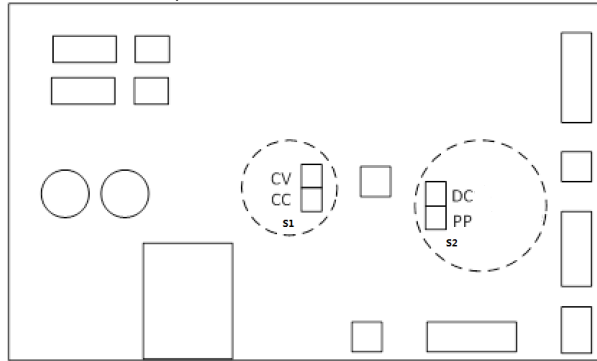
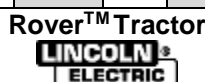


Figure 6 power source with welding mode setting

Recommended Welding Parameters

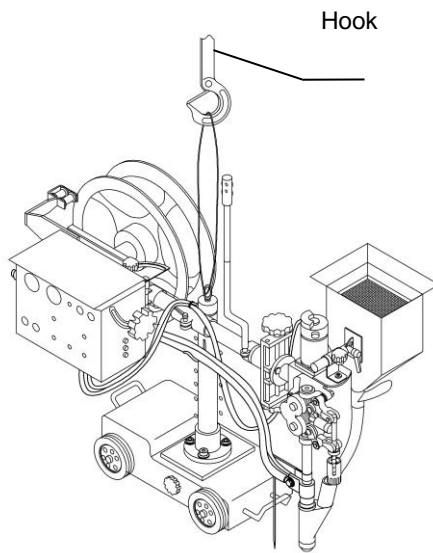
ROVER™ Tractor Welding Range																	
WFS vs Current (DC+)																	
Electrode Dia. (mm)	Normal Stickout (mm)	300 A		400 A		500 A		600 A		700 A		800 A		900 A		1000 A	
		IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min
2.4	25	57	1.4	82	2.1												
3.2	25	27	0.7	40	1	55	1.4	71	1.8	90	2.3						
4	25			24	0.6	34	0.9	45	1.1	56	1.4	68	1.7	81	2		
4.8	25					22	0.6	29	0.7	37	0.9	45	1.1	53	1.3	62	1.6

ROVER™ Tractor Acceptable welding range																	
WFS vs Current (DC-): WFS vs Current (DC-)/ votage will be 4-6V higher than DC+ @ same current																	
Electrode Dia. (mm)	Normal Stickout (mm)	300 A		400 A		500 A		600 A		700 A		800 A		900 A		1000 A	
		IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min	IPM	M/Min
3.2	> 50	66	1.7	98	2.5												
4	> 50			55	1.4	75	1.9	97	2.5								
4.8	> 50					47	1.2	59	1.5	72	1.8	86	2.2				



Matters need attention

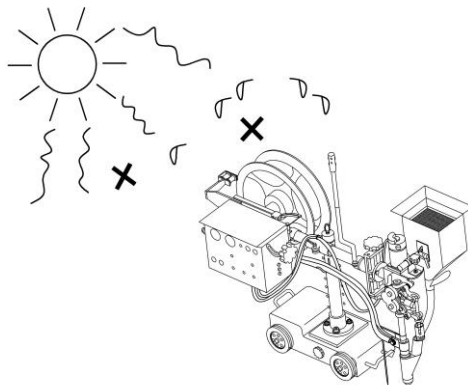
- The ROVER™ tractor has the hook. When you are lifting the tractor by the hook, please make sure that the tractor is balanced.
- The hook can not be used as the hanging equipment.



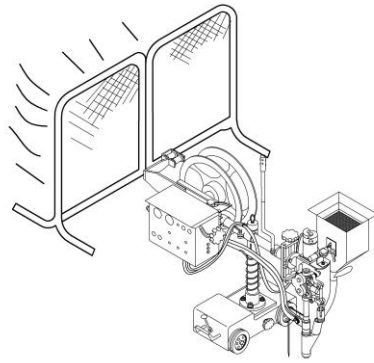
Warning

Not allowed to stand under the tractor when lifting

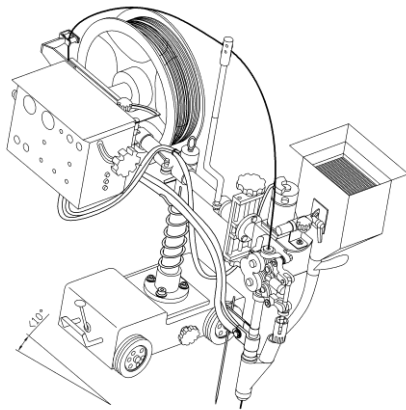
- Place the machine directly on a secure, leveled surface, less moist and less dust. We should also avoid the tractor located under direct sunlight or shower.



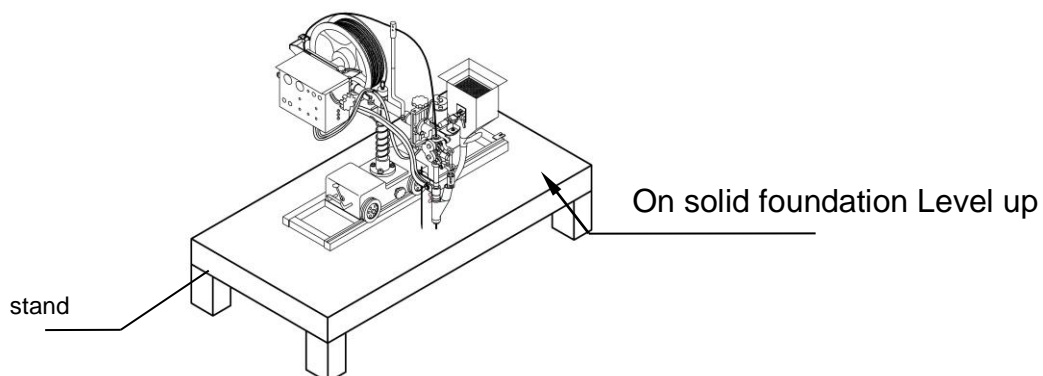
- Wind shield protection mechanism should be used when welding under gust wind conditions. When using fans in the summer, do not blow the wind from the fan directly to the arc rays under the torch nozzle (set up a screen protection), otherwise, the porosity will be very likely produced.



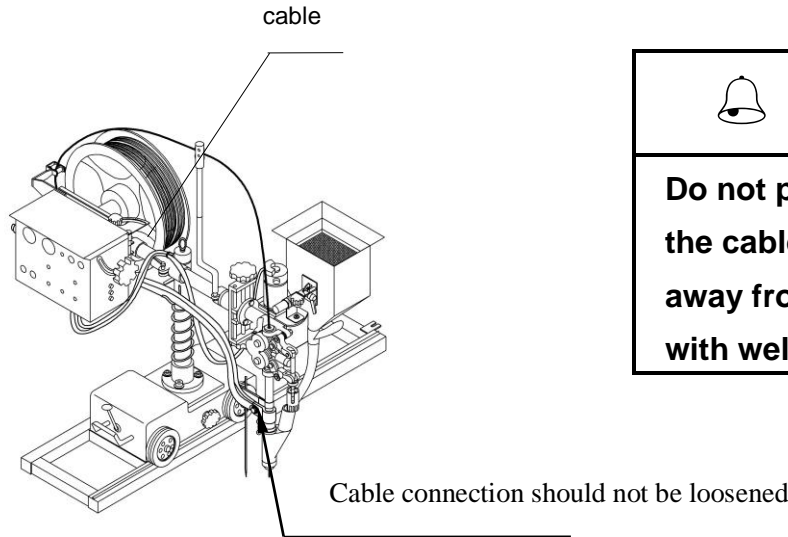
- Prevent the tractor from being overturned when it's placed on a slope surface. The gradient should be no more than 10°.



- There is no supporting device when this tractor is on working.
- When this tractor is working on a rack, make sure the rack is steady enough to prevent it from falling down.



- Check the insulation of the cable periodically. Replace immediately in case it is broken.



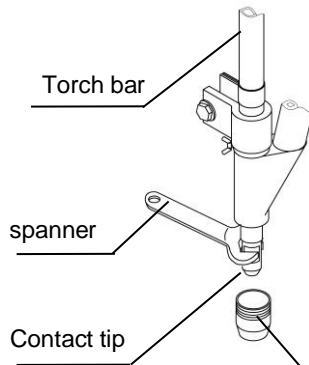
Attention

Do not put heavy stuff on the cable, keep cable away from direct contact with welding parts.

- Multi core cable connector should not be loosened, avoid bad contact which will affect the welding performance. Do not bend the cable frequently that will hurt the internal conductors.
- The bad contact between the contact tip and the torch bar will lead to bad conductivity and unstable arc. Please check carefully before application.

Important reminding

Clean the dust and dirt from the connection between the torch bar and contact tip when replacing the contact tip. Tighten with spanner.

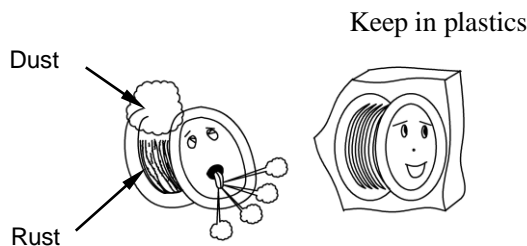


Attention

The loosening of the contact tip will affect the conductivity, cause overheating of the contact tip and torch bar, even damaging them.

Unscrew flux exit tube, screw it back on after tightening the contact tip

- Keep the wires from rust and dirt, which will cause welding defects.



- Please apply the tractor within the duty cycle scope as prescribed, conforming with the welding current.

The rated duty cycle of this tractor is 100%. The tractor should be applied under this limitation, the rising temperature will exceed allowable temperature of the power source and the tractor, resulting in downgrade of the welding quality and even damage of the machines.

- The wire feeding and travelling motor of the tractor are free of maintenance, do not disassemble them without authorization even failure is observed. Please contact us for troubleshooting for free.

- **Attention:** Do not disassemble the feeding motor. Unauthorized disassemble of the feeding motor is one of the reasons causing troubles.

Trouble shooting

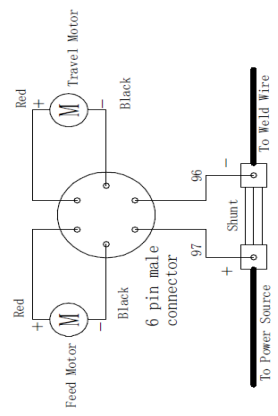
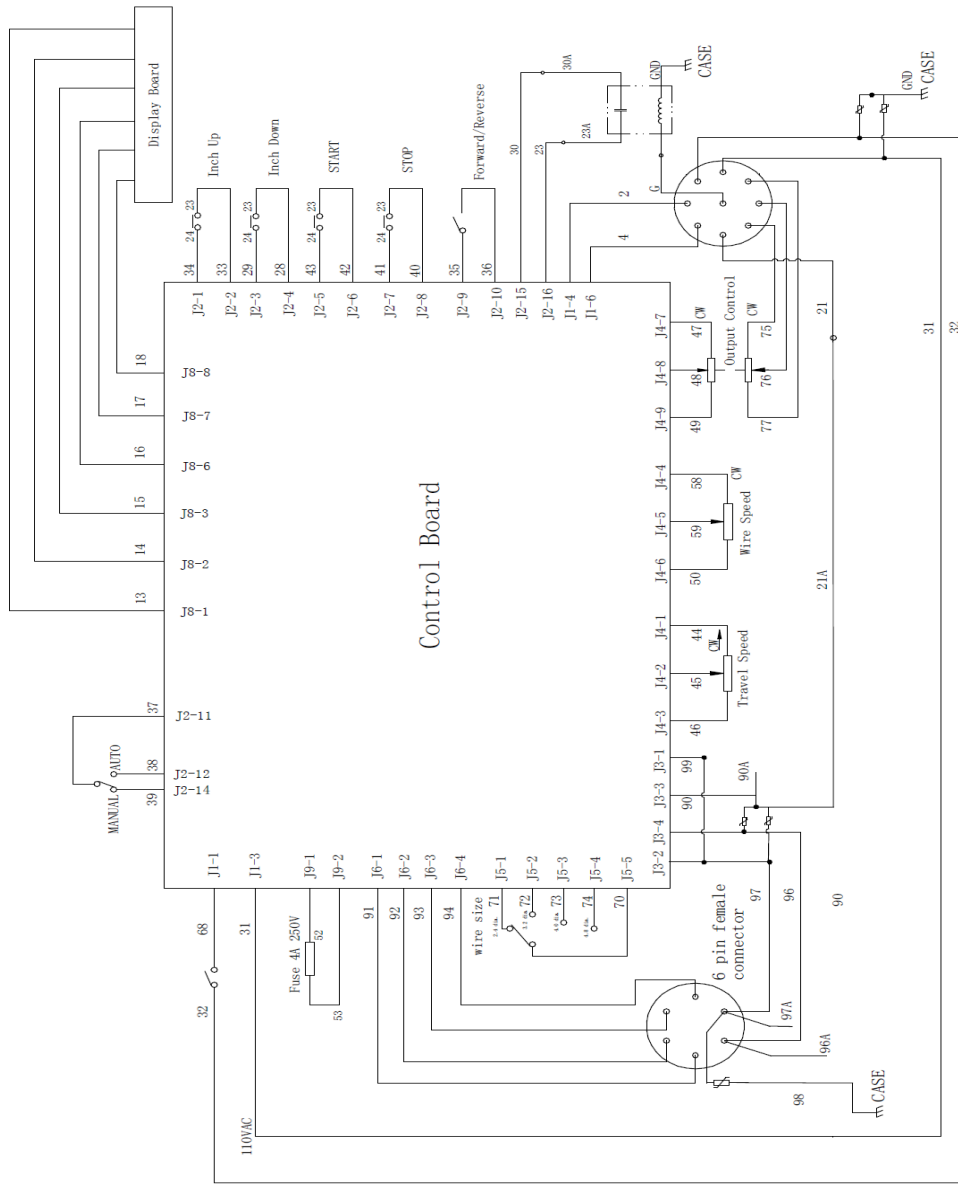
Attention

For some reason, you don't understand how to test or repair, please contact your local Lincoln Electric Authorized field service facility.

Observe all safety guidelines detailed throughout this manual

Problem (symptoms)	Possible cause	Recommended course of action
When you open the package and find obvious physical or electrical damages.	Transport collision or damage	Contact your local Lincoln Electric Authorized Field Service Facility
No power to tractor (turn on the power source and LED no display)	<ol style="list-style-type: none"> 1. No power to power source or power source's fuse is blown 2. Loose connection of control cable 3. LED plug loose in control box 4. Control board problem 	<ol style="list-style-type: none"> 1. Turn off circuit to check input power connection or fuse situation 2. Check control cable connection 3. Take off front panel to make sure LED plug get tight connection 4. If you can't solve it, please contact your local Lincoln Electric Authorized field service facility
Power on (switch on and LED display), but motor no operational, LED have display (no error code)	<ol style="list-style-type: none"> 1. Left of tractor control box have 4A fuse blown 2. Clutch at 'Manual' position 3. Motor driver IC broken 4. Motor or current detect plug is loose or at open circuit 	<ol style="list-style-type: none"> 1. Turn off circuit for check fuse 2. Take clutch at Auto position 3. Check motor or current detect plug connection 4. If you can't solve it, please contact your local Lincoln Electric Authorized field service facility
ROVER™ tractor can't control power source output (open circuit voltage)	<ol style="list-style-type: none"> 1. Control cable does not get tight connection 2. Power source problem 3. Power source wrong setting 4. ROVER™ tractor control board problem 	<ol style="list-style-type: none"> 1. Check control cable 2. Check power source 3. Make sure power source set on 'remote' control mode 4. If you can't solve it, please contact your local Lincoln Electric Authorized field service facility
Input fuse is broken	<ol style="list-style-type: none"> 1. Fuse specification, does not meet the requirement. Use Lincoln recommend fuse specification 2. Poor wire feeding, liner inside has been blocked or wire size is not matching with contact tip 3. Control board problem 	<ol style="list-style-type: none"> 1. Turn off circuit to replace fuses 2. If you can't solve it, please contact your local Lincoln Electric Authorized field service facility
While feeding wire manually, wire touches workpiece but not stop (touch sense function is disable)	<p>Wire and workpiece surface is dirty like slag, oily, rust and flux</p> <ol style="list-style-type: none"> 1. When finish the welding, do not cut the wire end 2. Welding bead is dirty, oily and rusty. 3. Welding cable is loose or open circuit 	<ol style="list-style-type: none"> 1. When finish of welding cut wire top 2. Clean welding bead 3. Check welding cable
ERR 0413 display on LED	<p>Travel motor over current problem.</p> <ol style="list-style-type: none"> 1. Motor circuit is short circuit 2. Control board problem 	<ol style="list-style-type: none"> 1. Turn off circuit for check motor circuit 2. If you can't solve it, please contact your local Lincoln Electric Authorized field service facility

ERR 0412 display on LED	<p>Travel motor overload</p> <ol style="list-style-type: none"> 1. ROVER™ tractor get too much load 2. ROVER™ tractor routine is blocked 3. Workpiece has a large slope 4. Control board problem 	<ol style="list-style-type: none"> 1. Reduce load 2. clean all slag and sundries on tractor routine 3. Make sure slope is met operation requirement 4. If you can't solve it, please contact your local Lincoln Electric Authorized field service facility
ERR 0082 display on LED	<p>Wire feeder overcurrent problem</p> <ol style="list-style-type: none"> 1. Wire feeder circuit is short circuit 2. Control board problem 	<ol style="list-style-type: none"> 1. Turn off circuit to check wire feeder circuit 2. If you can't solve it, please contact your local Lincoln Electric Authorized field service facility
ERR 0081 display on LED	<p>Wire feeder oberload</p> <ol style="list-style-type: none"> 1. Wire twist or tie 2. Large pressure 3. Wire is not matching with contract tip 4. Wire is blocked in liner 5. Control board broplem 	<ol style="list-style-type: none"> 1. Make sure the wire is straight 2. Adjust to suitable pressure 3. Replace contact tip 4. Clean the liner 5. If you can't solve it, please contact your local Lincoln Electric Authorized field service facility
ERR 414 display on LED	<p>Grounding circuit problem</p> <ol style="list-style-type: none"> 1. Welding circuit open 2. Some plugs loose in control box 3. Control board problem 	<ol style="list-style-type: none"> 1. Check the grounding 2. Turn off circuit to make sure that control box of plug is tightly connected 3. If you can't solve it, please contact your local Lincoln Electric Authorized field service facility



• World's Leader in Welding and Cutting •
THE SHANGHAI LINCOLN ELECTRIC CO.,LTD
No. 195, Lane 5008, Hu Tai Rd. Baoshan, Shanghai, PRC 201907
www.lincolnelectric.com.cn

Rover™ Tractor
The logo consists of the word "LINCOLN" in a bold, sans-serif font inside a rectangular box, with the word "ELECTRIC" in a smaller, bold, sans-serif font inside a smaller rectangular box directly below it.

PARTS LIST FOR
ROVER™ TRACTOR (CE)

ROVER™ TRACTOR (CE) For codes: 76306

Do Not use this Parts List for a machine if its code number is not listed. For any code numbers not listed, contact the Service Department via: china_service@lincolnelectric.com.cn.

Use the Illustration of Sub-Assemblies page and the table below to determine which sub assembly page and column the desired part is located on for your particular code machine.

SUB ASSEMBLY ITEM NO. →	I	II	III	IV	V
SUB ASSEMBLY PAGE NAME →	General Assembly	Wire Drive Assembly			
PAGE NO. →	PB-1	PC-1			
CODE NO. ↓					
76306	1	1			

Index of Sub-Assemblies
 Part Numbers
 Index of Sub-Assemblies
 Part Numbers
 Index of Sub-Assemblies
 Part Numbers
 Index of Sub-Assemblies
 Part Numbers



17



28

ROVER™ TRACTOR (CE)



ITEM	DESCRIPTION	PART NO.	QTY.	1						76306	1
1	Control Box	KP63060	1	X							
1a	Control Panel	L15749	1	X							
1b	M4x8 Screw	S26641-38	4	X							
1c	Control Panel Decal (CC) EN	M22723-1	1	X							
1c	Control Panel Decal (CV) EN	M22723-2	1	X							
2	Wire Reel Assembly	KP63061	1	X							
2a	Wire Reel Axle	KP63077	1	X							
3	Beam	KP63062	1	X							
4a	Wire Guide (Upper Part)	KP63063-1	1	X							
4b	Wire Guide (Lower Part)	KP63063-2	1	X							
5	Cross Adjuster	KP63325	1	X							
6	Feeder Motor	KP63065	1	X							
7	Flux Hopper Assembly (Long Shift)	KP63327	1	X							
8	Flux Hopper Bracket Assembly	KP63066	1	X							
9	Wire Feed Assembly	See Page PC-1	1	X							
10	Conduct Copper Lead	KP63070	1	X							
11	Pointer Assembly	KP63069	1	X							
12	Welding Cable	KP63128	1	X							
13	Mast Assembly	KP63072	1	X							
14	Reduction Box	KP63165	1	X							
15	Base, Includes:	KP63326	1	X							
16	Wheels	KP63075	4	X							
17	Shunt	KP63129	1	X							
17a	Shunt Cover A	M24697	1	X							
17b	Shunt Cover B	M24697-1	1	X							
17c	M4x10 Screw	S28798-3	1	X							
17d	M5x12 Screw	S28798-4	2	X							
18	Button (Yellow)	M24703-2	2	X							
19	Button (Red)	M24703-1	1	X							
20	Toggle Switch, SPST	T10800-4	2	X							
21	Motor and Current Harness - J3&J6, Includes:	G7312-9	1	X							
21a	6-Pins Socket	S26179	1	X							
21b	M3x12 Flat Head Philips Screw	S26641-1	3	X							
22	Button (Green)	M24703-3	1	X							
23	Toggle Switch, SPDT	T10800-23	1	X							
24	Fuse Holder	T12386-6	1	X							
24a	Fuse, 4A 250V (Not Shown)	T10728-74	1	X							
24b	Fuse Decal (Not Shown)	S26743-10	1	X							
24c	Fuse Harness - J9 (Not Shown)	G7312-6	1	X							
See next page for more.											

NOTE: Use only the parts marked "X" in the column under the heading number called for in the model index page.

ROVER™ TRACTOR (CE)



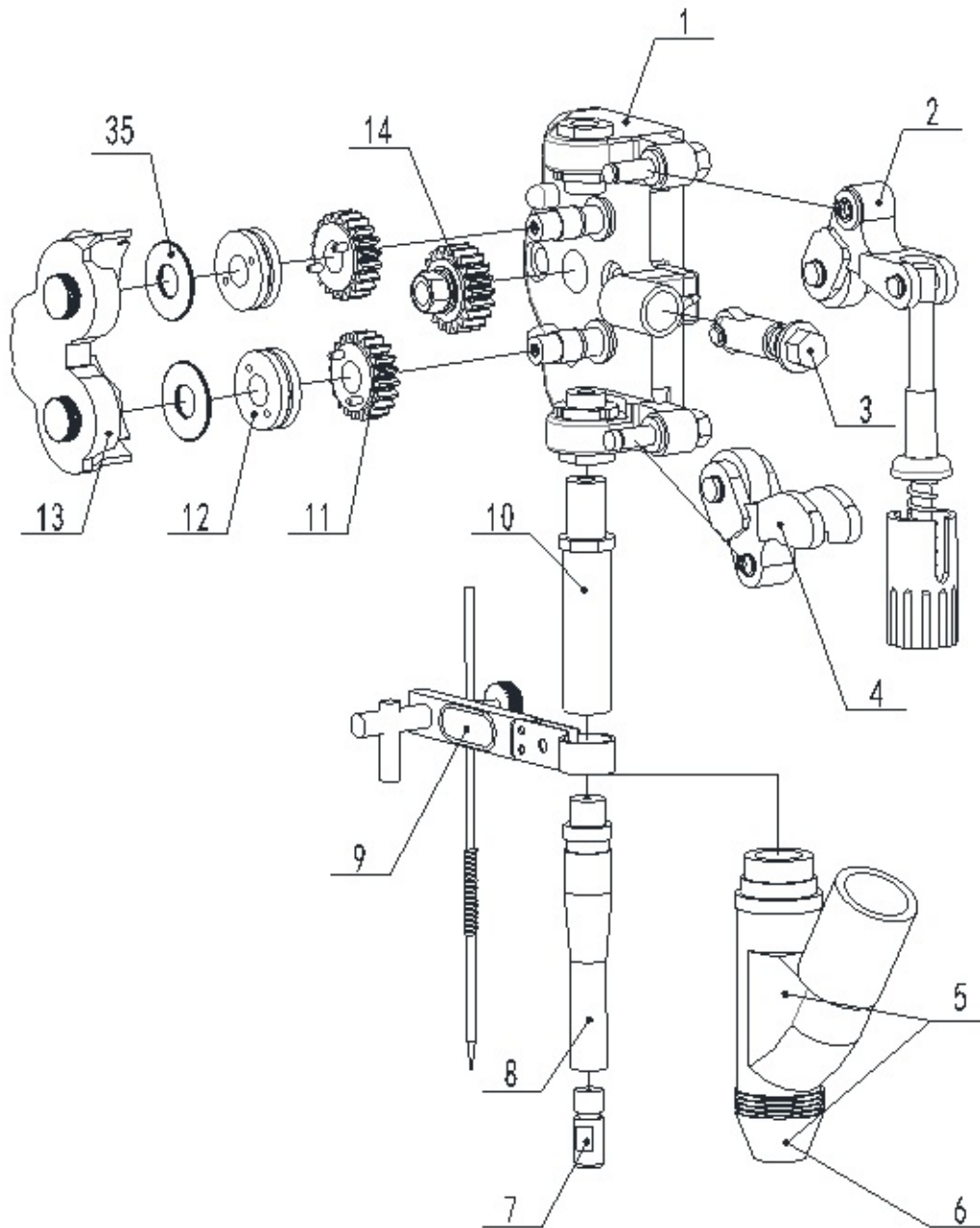
2017.08

(Continued)

ITEM	DESCRIPTION	PART NO.	QTY.	1					76306	1
25	Side Panel Harness - J1&J4, Includes:	G7312-5	1	X						
25a	9-Pins Socket	S28574-2	1	X						
25b	Potentiometer (Not Shown)	T10812-119	2	X						
25c	Potentiometer (Not Shown)	S29426	1	X						
25d	Potentiometer Spacer (Not Shown)	S18280	3	X						
25e	Toroidal Core (Not Shown)	S19316-3	5	X						
26	Display Board	M24705-1	1	X						
26a	Display Harness - J8 (Not Shown)	G7312-2	1	X						
28	Control Board	S29833	1	X						
28a	M4x10 Screw	S28798-3	4	X						
28b	Panel Harness (Not Shown)	G7312-3	1	X						
28c	Wire Selection Harness - J5, Includes:	G7312-4	1	X						
28d	4 Position Rotary Switch	S16670-20	1	X						
28e	Ground Protection Harness (Not Shown), Includes:	G7312-7	1	X						
28f	Reed Switch (Not Shown)	NSS	1	X						
29	Knob (Larger)	T10491-7	3	X						
30	Knob (Smaller)	T13639-6	1	X						
31	O-Ring (Not Shown)	T13483-34	4	X						
32	Label (Not Shown)	M20952	1	X						
33	Flux Hopper Filter (Not Shown)	KP63083	1	X						
34	Walking Track (Not Shown)	KP63127	1	X						

NOTE: Use only the parts marked "X" in the column under the heading number called for in the model index page.

NSS – Not Sold Separately



ROVER™ TRACTOR (CE)



ITEM	DESCRIPTION	PART NO.	QTY.	1						76306	1
1	Feeding Plate Assembly, Includes: Bracket	KP63164 KP63088	1 1	X X							
2	Handle and Upper Pressure Assembly	KP63087	1	X							
3	Straightening Roll Assembly	KP63121	1	X							
4	Lower Pressure Assembly	KP63112	1	X							
5	Nozzle Assembly, Includes:	KP63086	1	X							
6	Nozzle	KP63093	1	X							
7	Tip 2.4mm (Optional)	KP63098-24	1	X							
7	Tip 2.5mm (Optional)	KP63098-25	1	X							
7	Tip 3.0mm (Factory Default)	KP63098-30	1	X							
7	Tip 3.2mm (Optional)	KP63098-32	1	X							
7	Tip 4.0mm (Factory Default)	KP63098-40	1	X							
7	Tip 4.8mm (Optional)	KP63098-48	1	X							
7	Tip 5.0mm (Factory Default)	KP63098-50	1	X							
7	Tip 6.0mm (Optional)	KP63098-60	1	X							
8	Gun Tube	KP63068	1	X							
10	Wire Guide	KP63071	1	X							
11	Driven Gear	KP63091	2	X							
12	Drive Roll 2.0~2.8mm (Optional)	KP63092-2	2	X							
12	Drive Roll 3.0~4.0mm (Factory Default)	KP63092-3	2	X							
12	Drive Roll 4.2~5.0mm (Factory Default)	KP63092-4	2	X							
12	Drive Roll 6.0mm (Optional)	KP63092-5	2	X							
13	Gear Cover	KP63073	1	X							
14	Driving Gear	KP63090	1	X							
35	Oil Washer	KP63094	2	X							
36	Extension Tube-50mm (Optional, Not Shown)	KP63160	1	X							
36	Extension Tube-70mm (Optional, Not Shown)	KP63160-1	1	X							
36	Extension Tube-150mm (Optional, Not Shown)	KP63160-2	1	X							

NOTE: Use only the parts marked "X" in the column under the heading number called for in the model index page.