

OPERATION INSTRUCTION

MIG-400/ MIG-500TR

SAFETY PROFESSION QUALITY

NGEN
EMPOWERING FUTURE

Dear Customer

Thank you very much for being our valued customer. The welders are built from high-quality components, and each machine passes a number of industry-leading lab tests to provide a superior welding experience and performance. For your safety, please read and understand this manual carefully before using this product. Your satisfaction is our top priority! If you have any questions or concerns, please feel free to contact us support:

info@ngen-global.com

CONTENT

1. Safety..... 3

2. General description..... 4

3. Circuit diagram..... 5

4. Main parameter..... 5

5. Panel structure..... 6

6. Installation & Operation..... 7

7. Caution.....11

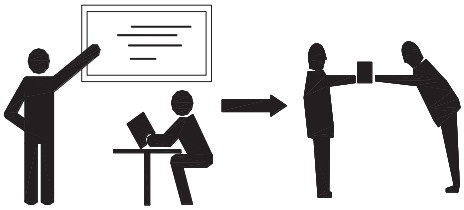
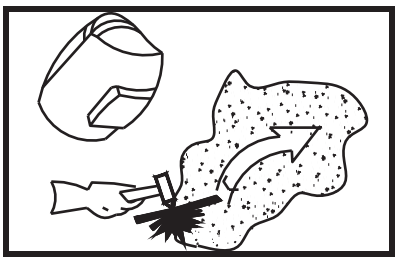
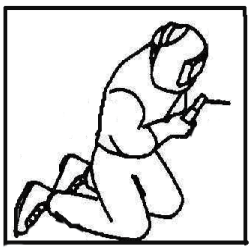
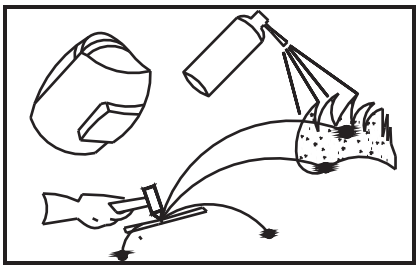
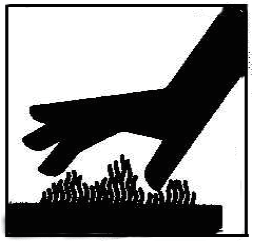
8. Maintenance.....11

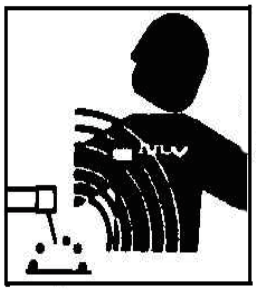
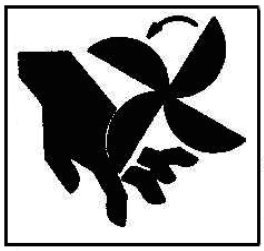
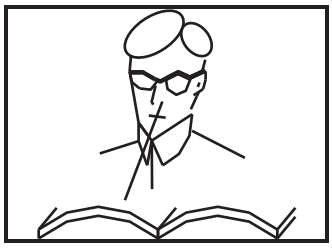
9. Troubleshooting.....12

10. Speedread table.....13

1. SAFETY

Welding is dangerous, and may cause damage to you and others, so take good protection when welding. For details, please refer to the operator safety guidelines in conformity with the accident prevention requirements of the manufacturer.

	Professional training is needed before operating the machine. ·Use labor protection welding supplies authorized by national security supervision department. ·The operator must be special personnel with a valid "metal welding (OFC) operations" operation certificate. ·Cut off power before maintenance or repair.
	Electric shock —may lead to serious injury or even death. ·Install earthing device according to the application criteria. ·Never touch the live parts when skin bared or wearing wet gloves/clothes. ·Make sure that you are insulated from the ground and workpiece. ·Make sure that your working position is safe.
	Smoke& gas —may be harmful to health. ·Keep the head away smoke and gas to avoid inhalation of exhaust gas from welding. ·Keep the working environment in good ventilation with exhaust or ventilation equipment when welding.
	Arc radiation —may damage eyes or burn skin. ·Wear Suitable welding masks and protective clothing to protect your eyes and body. ·Use suitable masks or screens to protect spectators from harm.
	Improper operation may cause fire or explosion. ·Welding sparks may result in a fire, so please make sure no combustible materials nearby and pay attention to fire safety. ·Have a fire extinguisher nearby, and have a trained person to use it. ·Airtight container welding is forbidden ·Pipe thaw with this machine is forbidden.
	Hot workpiece may cause severe scalding. ·Don’t contact hot workpiece with bare hands. ·Cooling is needed during continuous use of the welding torch.

	Magnetic fields affect cardiac pacemaker. ·Pacemaker users should be away from the welding spot before medical consultation.
	Moving parts may lead to personal injury. ·Keep yourself away from moving parts such as fan. ·All doors, panels, covers and other protective devices should be closed and in place.
	Machine fault —seek professional help when encountering any difficulties. ·Consult the relevant contents of this manual If you encounter any ·Contact the service center of your supplier or NGEN service center reading the manual or still can not solve the problem according to the manual.

2. GENERAL DESCRIPTION

（1）Advanced IGBT inverter technology

（2）Inverter frequency is 20 KHz, greatly reducing the volume and weight of the welder.

（3）Great reduction in metal loss obviously enhances the welding efficiency and energy saving effect.

（4）Switching frequency is beyond audio-range, which almost eliminates noise pollution.

Leading control mode

（5）Closed loop feedback control, constant voltage output, fit for wide voltage range (±15%)

（6）Adjustable welding voltage, precisely matching the welding current, excellent welding characteristics.

（7）Unique welding dynamic characteristic control circuit, stable welding arc, little splash, beautiful shaping, high welding efficiency.

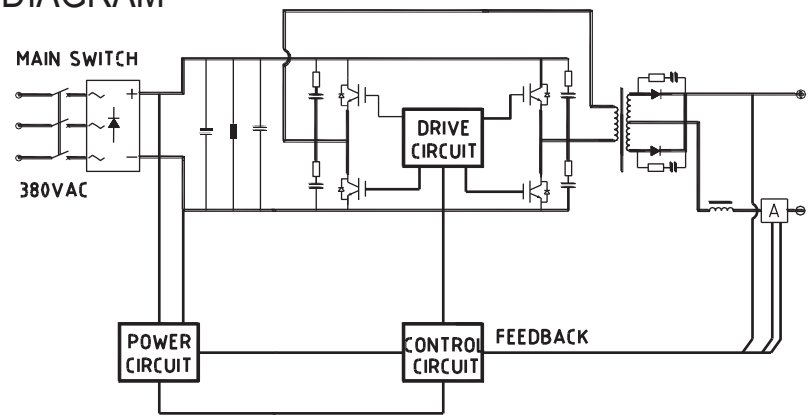
（8）Auto-maintaining/-stopping arc operation mode available, be able to meet various welding requirement.

（9）Function of removing the molten ball after welding available, high no-load, slow wire feeding, high successful rate of arc starting.

（10）CO2 welding and MAG welding available.

（11）Welding wire with a diameter of 0.8-1.6, such as H08Mn2Si、H08MnSi、H04MnSiAlTiA、H18CrMnSiA、H08CrMn2SiMo、H10MnSiMo and H10MnSiMoTi, can be used.

3. CIRCUIT DIAGRAM

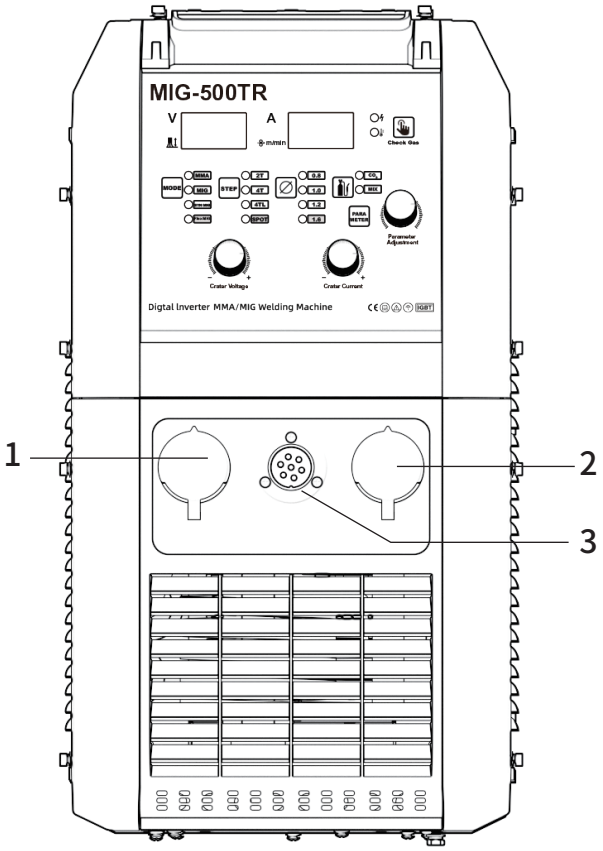


4. MAIN PARAMETER

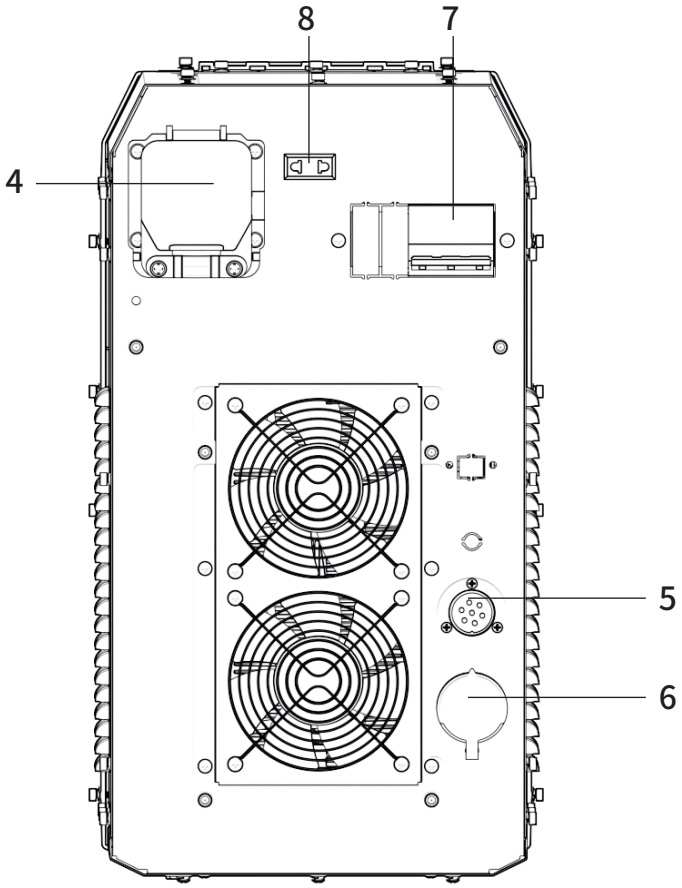
Model	MIG-400	MIG-500TR
Input Voltage	AC380V,3-PH	AC380V,3-PH
Line Frequency	50/60 Hz	50/60 Hz
Rated Input Power Capacity	18.2KVA	23.5KVA
Rated Input Current	27.7A	39.5A
Max. Open Circuit Voltage	76V	76V
Rated Output Current	400A	500A
Rated Duty Cycle	80%	80%
Output Voltage Range	17.5-34V	17.5-39V
Output Current Range	45-400A	45-500A
Idle power	60W	60W
Efficiency	≥ 90%	≥ 90%
Power Factor	85%	85%
Insulation Class	F	F
Protection Class	IP21S	IP21S

	Wire Feeder
Input voltage of feeder (V)	24
Power output of feeder motor (W)	80
Wire diameter (mm)	0.8-2.4
Rated wire feeding speed (m/min)	2.5 -21
Compatible wire types	• Carbon steel • Stainless steel • Aluminium magnesium • Aluminium silicon
Protection gas	• Carbon dioxide • Pure Argon • Argon-Carbon diox-ide-Oxygen • Argon and Carbon dioxide blends
Coolant Maximum pressure (bar)	Distilled water 3,5
Insulation class	F
Motor and control pro-tection grade	IP 21
Dimensions (mm)	654x320x390
Weight (kg)	14

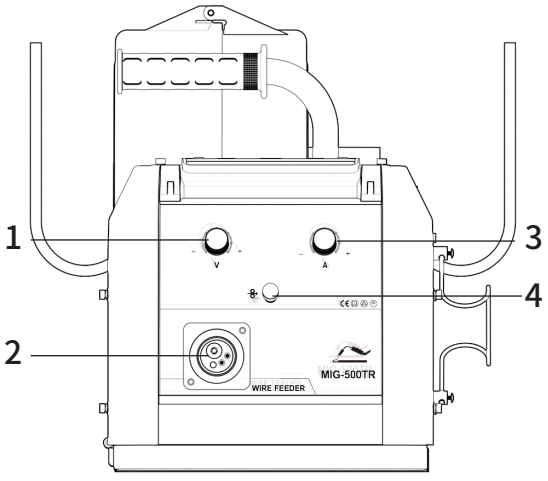
5. PANEL STRUCTURE



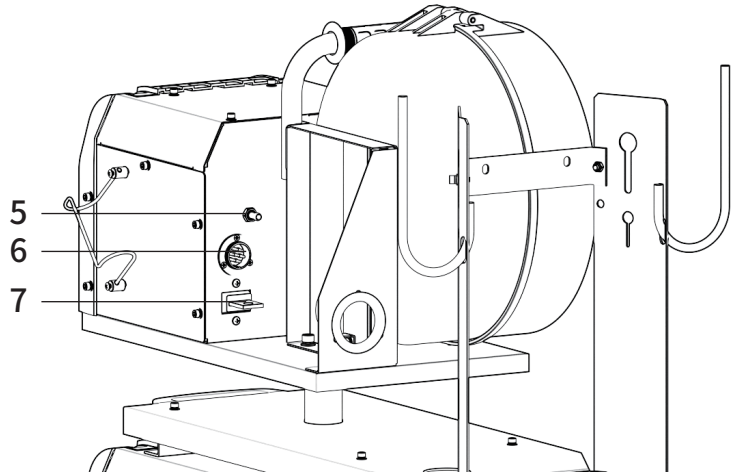
1.Fast coupling straight polarity.
2.Fast coupling Reverse polarity
3.Communication interface.
4.Junction box



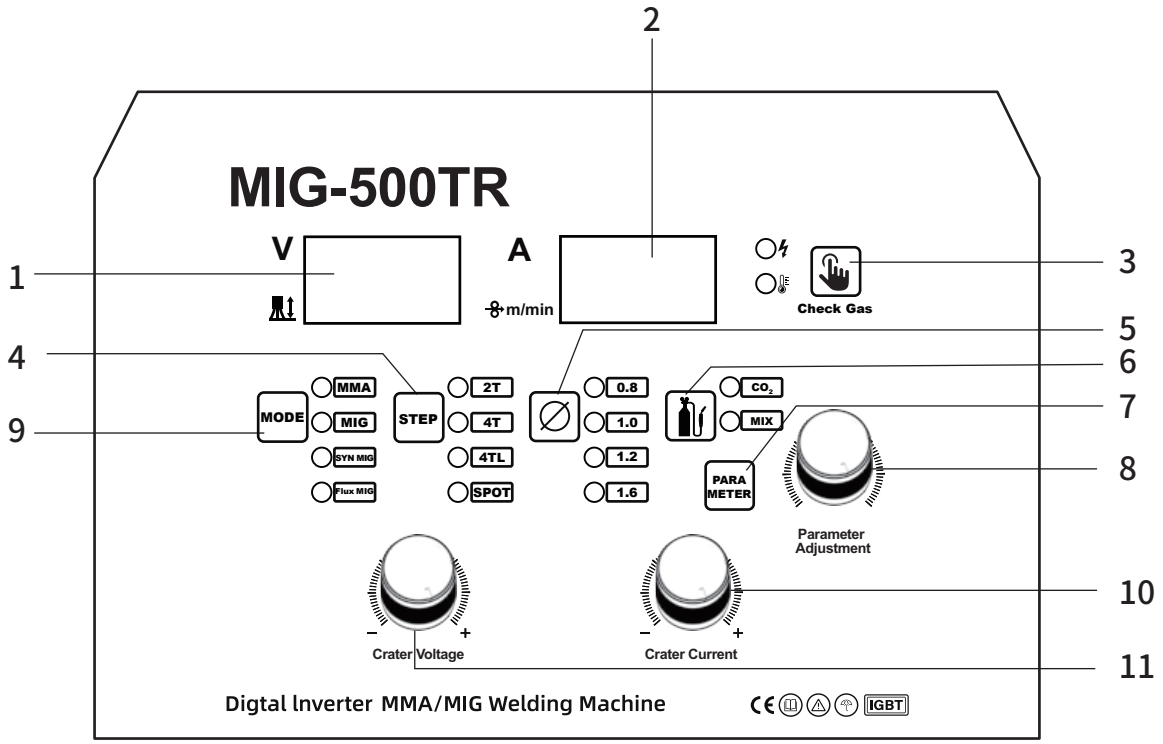
5.Communication interface.
6.Fast coupling straight polarity.
7.Power switch.
8.AC36V output power



1.Voltage encoder knob.
2.Fast coupling Reverse polarity
3.Current encoder knob
4.Wire feeding test key



5. Gas tube.
6. Communication interface.
7.Straight polarity.



1.Voltage Display
2.Current Display
3.Check Shield Gas Button
4.Operating Mode
5.Wire Diameter Selection
6.Shield Gas Switching
7.Parameter Adjustment
8.Parameter Adjustment Knob
9.Mode Switching
10.Arc Termination Current
11.Arc Termination Voltage

Note:These drawings apply to both MIG-400 and MIG-500TR

6. Installation & Operation

Note: ·Please install the machine strictly according to the following steps.

·Electric connection operation should be after turning off the power supply switch of the switch box.

·The protection class of this machine is IP21S, so avoid using it in rain.

Figure 6-1: Connection of switch box (for reference only)

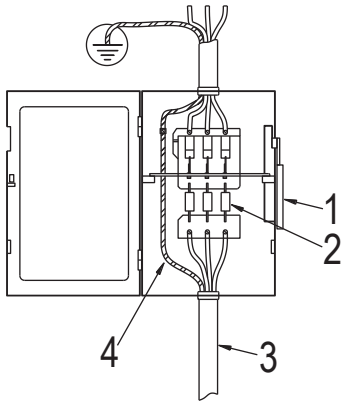


Figure 6-1 Connection of switch box

1. Power supply switch of switch box
2. MIG-400:Fuse ≥50A,MIG-500TR:Fuse ≥63A
3. Cable of welding machine
4. Yellow-green earth cable (earth, not connect zero cable)

Do the connection work according to the method showed in the picture or other correct methods. Make sure the main power is cut off before connection.

⚠ Note: No operation with electricity on.

- Ask professional electrician to do the connection.
- Do not connect two welding machines to the same switch box.
- Cable 4 is unnecessary to be earthed if the machine cabinet is earthed.

6.1 Installation

(1) Input 3-phase AC power of 50Hz/60Hz to the power input terminal (AC INPUT) on the back panel of the machine with a power cable of appropriate specification through a fuse with a capacity of 40A or more. (When connecting the cable, do earth the machine reliably with a lead of 4mm2 or more.)

(2) Earth the machine reliably at the earthing mark on the case of the machine.

(3) Plug the wire feeder cable into the "+" socket at the bottom on the front panel of the machine, and tighten it clockwise.

(4) Plug the earth clamp cable into the "-" socket at the bottom on the front panel of the machine, and tighten it clockwise.

(5) Install the welding torch and set the welding wire coil on the wire feeder, matching the groove position of the wire feeding wheel with the contact tip of the welding torch and the welding wire diameter. Meanwhile, plug the pilot plug of the wire feeder into the pilot socket at the bottom on the front panel of the welding machine, and feed out / extrude out of the torch head by pressing the inching wire feeding switch.

(6) Connect the gas hose of the wire feeder to the gas meter on the gas bottle.

CONNECTING THE WIRE-FEEDER/GENERATOR INTERCONNECTION CABLE

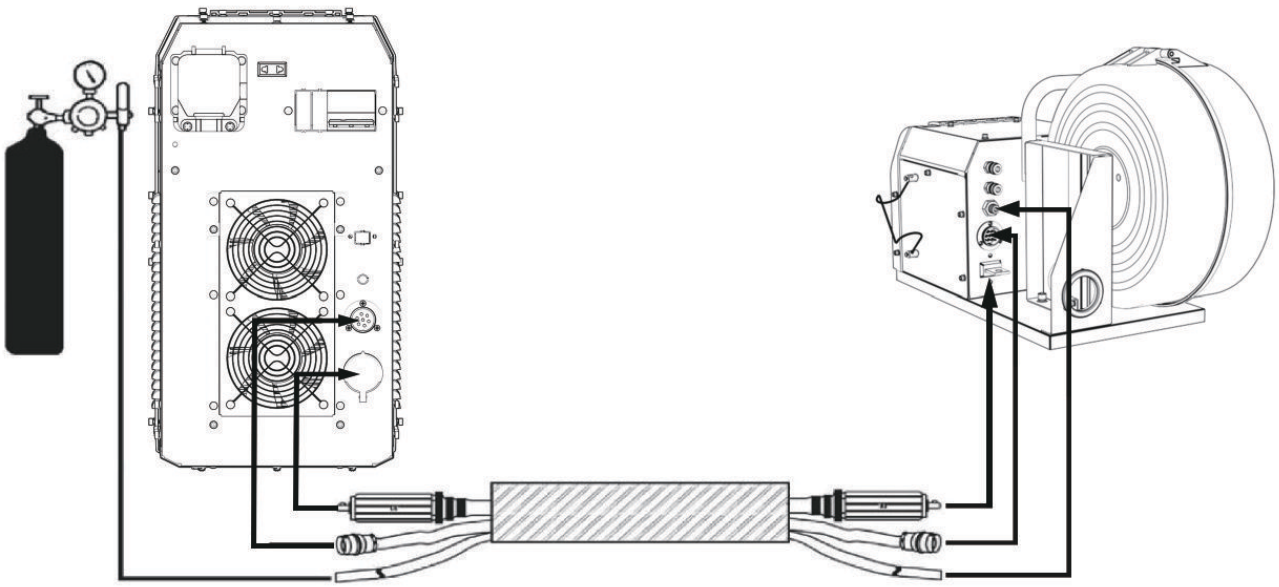
This cable connects the welding machine to the wire-feeder.

WARNING: *Do not disconnect the wire-feeder until the machine has been switched off (see paragraph "Alarm conditions").*

■ **DIRECT-POLARITY welding**

Connect up the interconnection cables (power cable, ancillary wiring and gas tube) to the special attachments and couplings shown in Figure 1.

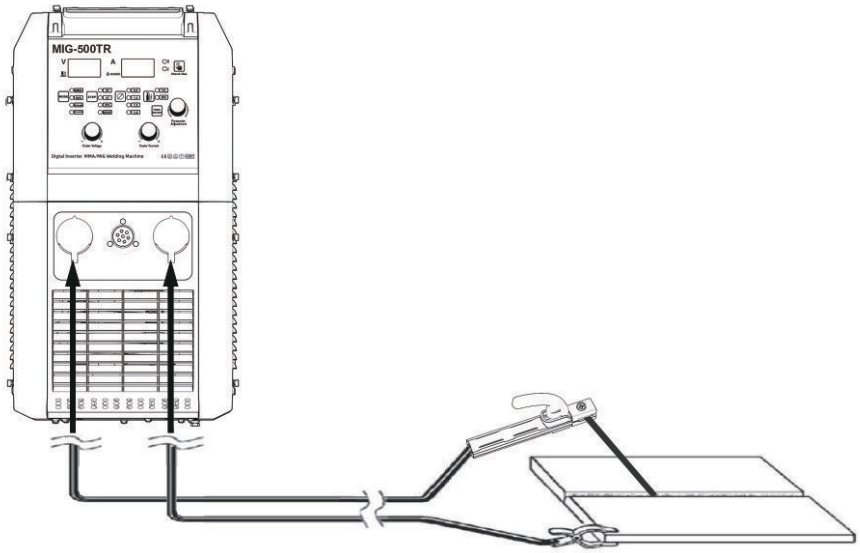
The delivery and return water tubes, used for cooling the torch of the welding machine, are part of the interconnection cable and should be connected as follows:
interconnection cable on generator side: connect up air plug and welding cable (positive) to their rapid couplings;
wire feeder side connecting cable: connect up air plug, air pipe and welding cable (positive) to their rapid couplings (Figure 1);



CONNECTION OF THE WELDING CABLES

■ Electrode welding (MMA)

With the machine disconnected from the supply, connect the welding cables to the out terminals (positive and negative) of the welder, connecting them to the gripper and the earth, with the correct polarity provided for the type of electrode to be used. Choosing the indications supplied by the electrode manufacturer, the welding cables must be as short as possible, close to one other, and positioned at floor level or close to it.

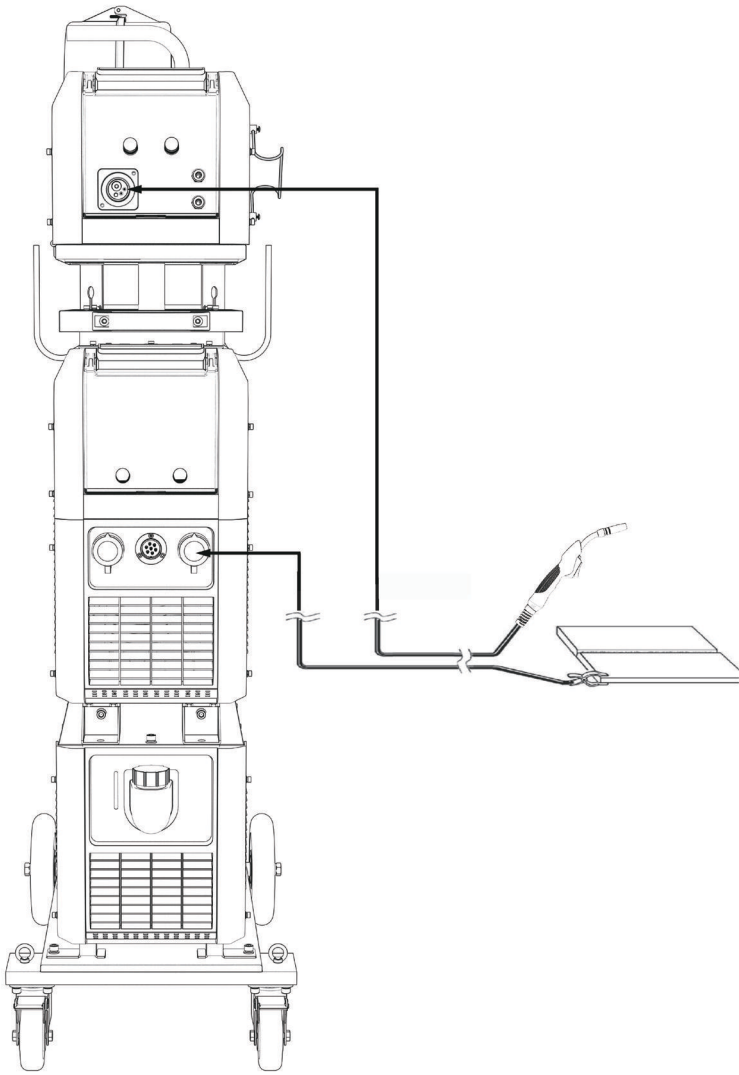


■ MIG-MAG / MIG PULSED / MIG DUAL PULSED welding

DIRECT-POLARITY welding

To start MIG-MAG welding, make the connections shown in Figure 3, more precisely (with the machine switched off): connect the generator - feeder connecting cable as shown in Figure 3. Gas cylinders are supplied with a pressure reducer to adjust pressure of the gas used for welding;

- connect up the earthing system cable to the rapid coupling marked by a - (negative) symbol and then the relevant earth clamps to the piece being welded or to its support in an area free from rust, paint and grease. Using particularly long earthing cables reduces the voltage and causes some problems from increased resistance and inductance of the cables that could cause faulty welding. Follow instructions to avoid these problems:
  - use earthing and extension cables with appropriate section;
  - lay out the cables as a flat as possible to prevent them from coiling up.
- screw the torch power cable to the centralized attachment on the front panel of the wire-feeder and connect up the delivery and return water tubes to their rapid couplings located on the wire-feeder.



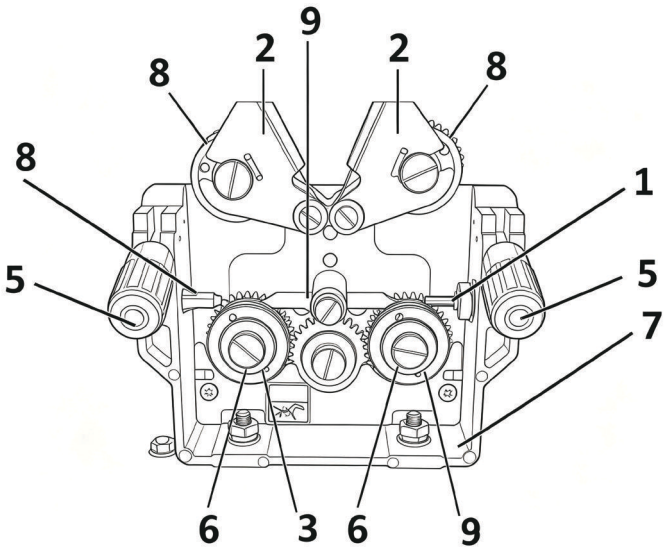
Loading Wire

- Open the side panel and fit the reel on the support so that the wire unrolls clockwise, and center the projecting reference on the support with the relative hold on the reel.
- Thread the end of the wire into the back guide (Pos. 1, Figure 4) on the drawing mechanism.
- Releasing the roll pressure device (Pos. 5, Figure 4), Lift up the idle rolls (Pos. 8, Figure 4) Make sure that the drive rolls (Pos. 3, Figure 4) have the diameter corresponding to the wire being used stamped on the outside.
- Thread the wire into the central wire guide (Pos. 9, Figure 4) and into the wire guide of the centralized attachment (Pos. 4,Figure 4) for a few centimetres. Lower the idle roll-holder arm making sure the wire goes into the slot of the drive roll. If necessary, adjust the pressure between the rolls with the screw provided (Pos. 5, Figure 4). The correct pressure is the minimum that does not allow the rolls to skid on the wire. Excessive pressure will case deformation of the wire and tangling on the entrance of the sheath; insufficient pressure can cause irregular welding.

Assembly Of Drive Rolls

Unscrew the two screws (Pos. 6, Figure 4) and lower the safety guard of the gearing (Pos. 7, Figure 4). Lift up the idle rollholder arm (Pos. 2, Figure 4) and proceed as follows:

- Each roll shows the type of wire and diameter on the two external sides.
- Install the right rolls (Pos. 3, Figure 4) making sure the groove is in the correct position for the diameter of the wire being used.
- Close up the gearing safety guard again.



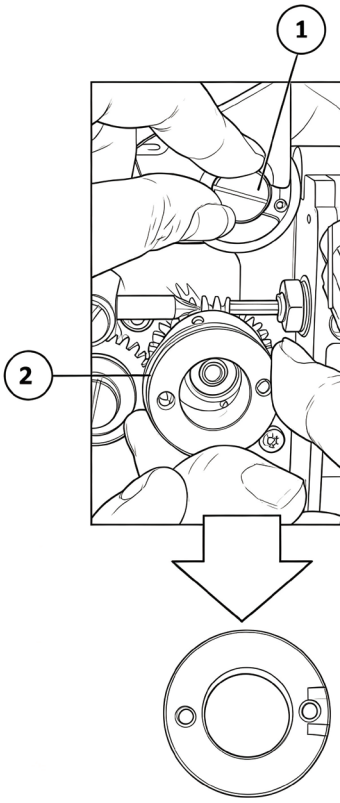


Figure 5

7. CAUTION

7.1 Working Environment

(1) Welding should be carried out in a relatively dry environment with its humidity of 90% or less.

(2) The temperature of the working environment should be within -10 ℃ to 40℃ .

(3) Avoid welding in the open air unless sheltered from sunlight and rain, and never let rain or water infilter the machine.

(4) Avoid welding in dusty area or environment with corrosive chemical gas.

(5) Avoid gas shielded arc welding in environment with strong airflow.

7.2 Good Ventilation

This industrial welding machine has so big welding current when working that nature ventilation can not meet the cooling demand, while the inner fan enables the machine to work steadily by its effective cooling. Operator should make sure the louvers are uncovered and unblocked. The minimum distance between the machine and nearby objects should be 30cm. Good ventilation is of critical importance to the normal performance and service life of the machine.

7.3 No Overvoltage

If the voltage exceeds the permitted limit, the machine will be damaged, so pay attention to the changes in voltage. Once overvoltage occurs, stop welding and switch off the power.

7.4 Overheating Protection

Overheating protection appears while the machine is of overload status because of continuous welding for a long time, and a sudden halt of welding occurs. In this case, it is unnecessary to restart the machine, but just wait for the overheating LED to go out, and welding can be recovered.

8. MAINTENANCE



WARNING: The following operation requires sufficient professional knowledge on electric aspect and comprehensive security knowledge. Operators should be holders of valid qualification certificates which can prove their skills and knowledge. Make sure the input cable of the machine is cut off from the electricity before uncovering the welding machine.

1. Check periodically whether inner circuit connection is ok (esp. plugs). Tighten the loose connection. If there is oxidization, remove it with sandpaper and then reconnect.

2. Keep hands, hair and tools away from the moving parts such as the fan to avoid personal injury or machine damage.

3. Clean the dust periodically with dry and clean compressed air. If welding in environment with heavy smoke and pollution, the machine should be cleaned daily. The pressure of compressed air should be at a proper level lest the small parts inside the machine be damaged.
4. Avoid rain, water and vapor infilter the machine. If there is, dry it and check the insulation with a megger (including that between the connections and that between the connection and the case). Only when there is no abnormal phenomena can welding be continued.
5. Check periodically whether the insulation skin of all cables are perfect. If there is any damage, wrap it or replace it.
6. Check periodically whether the gas hose has any cracks. If any, get them replaced.
7. Put the machine into the original packing in dry location if it is not to be used for a long time.

9. TROUBLESHOOTING



WARNING: The following operation requires sufficient professional knowledge on electric aspect and comprehensive security knowledge. Operators should be holders of valid qualification certificates which can prove their skills and knowledge. Make sure the input cable of the machine is cut off from the electricity before uncovering the welding machine.

Common Malfunction Analysis and Solution

Malfunction Phenomena	Solution
1. The protection LED turns on.	1. Overheating protection (1) Check the welding current and welding time. Operate according to the requirement referring to the instruction manual. (2) Check the fan's running status when welding. If the fan does not work, check if there is a power supply of 220V: If the power supply is normal, check the fan; if the power supply is abnormal, check the connecting cable of the power supply. (3) Replace the thermal switch if it is damaged. 2. Over-current protection This implies a machine fault or an accidental break-off caused by interference. Restart the machine. If over-current problem still exists, contact the service personnel of our company.
2. No response when pressing the welding torch switch and the protection LED is off.	1. Check if the power LED and the digital meter are on. 2. Check if the welding torch switch is in good contact, and check the connection condition of the welding torch junction. 3. Check the connection condition of the wire feeder junction.
3. Press the welding torch switch to feed wire, the wire feeder feed wire, but no output current and the protection LED is off.	1. Check if the earth cable is in good contact. 2. Check if the wire feeder cable is connected correct. 3. Check if the welding torch is damaged.

4. Press the welding torch switch to feed gas, there is current output, but the wire feeder does not feed wire.	1. Check if the control cable of the wire feeder is broken. 2. Check if the wire feeder is blocked. 3. Check if the control PCB of the welding machine fails. 4. Check if the wire feeder is damaged.
5. Press the welding torch switch, welding can be carried out, but the current is too high, the voltage can not be adjusted, and the no-load voltage is too high.	1. Check if the control cable of the wire feeder is broken. 2. Check if the control PCB of the welding machine fails.
6. The welding current is unstable.	1. Check if the moment knob of the wire feeder is appropriate. 2. Check if the welding wire matches the wire feeding wheel. 3. Check if the contact tip of the welding torch is seriously worn and torn. If it is, replace it and tighten it. 4. Check if the wire-feeding tube of the welding torch is worn and torn. Replace it every 15 days. 5. Check if the welding wire is of good quality.
7. The protection effect of welding bead is not good at the end of welding.	1. When stopping welding, do not move the welding torch away immediately, in order that the shielded gas can fully protect the hot welding bead. 2. Prolong the post-flow time of the shielded gas, and contact our company.
8. The crater is too big after welding.	1. Use 4T mode, and stop arc with low current. 2. Change operation mode.
9. The gas meter can not be heated.	1. Check if the plug of the heater is well plugged in. 2. Check if the auto-recover insurance is in good condition. 3. Check if the heater inside the gas meter is damaged.

10. Speedread table (for reference only)

The option of the welding current and welding voltage directly influences the welding stability, welding quality and productivity. In order to obtain the good weld, the welding current and welding voltage should be set optimally. Generally, the setting of welding condition should be according to the welding wire diameter, the required molten drop intergradation and the production requirement. The following parameters are available for reference.

10.1 Parameters for butt-welding

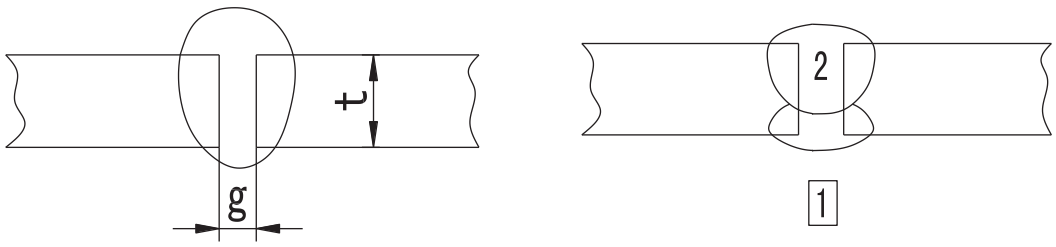


Plate thickness t(mm)	Gap g(mm)	Wire diameter φ(mm)	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)	Gas volume (L/min)	Layer
1.2	0	1.0	70~80	17~18	45~55	10	1
1.6	0	1.0	80~100	18~19	45~55	10~15	1
2.0	0～0.5	1.0	100~110	19~20	40~55	10~15	1
2.3	0.5～1.0	1.0 or 1.2	110~130	19~20	50~55	10~15	1
3.2	1.0～1.2	1.0 or 1.2	130~150	19~21	40~50	10~15	1
4.5	1.2～1.5	1.2	150~170	21~23	40~50	10~15	1

10.2 Parameters for flat fillet welding

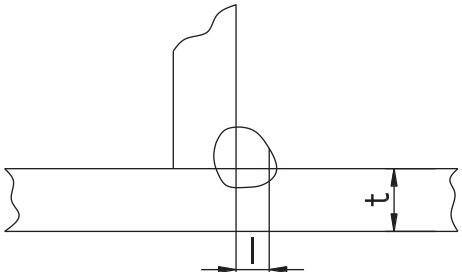


Plate thickness t(mm)	Corner size l(mm)	Wire diameter φ(mm)	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)	Gas volume (L/min)
1.2	2.5~3.0	1.0	70~100	18~19	50~60	10~15
1.6	2.5~3.0	1.0	90~120	18~20	50~60	10~15
2.0	3.0~3.5	1.0	100~130	19~20	50~60	10~20
2.3	2.5~3.0	1.0 or 1.2	120~140	19~21	50~60	10~20
3.2	3.0~4.0	1.0 or 1.2	130~170	19~21	45~55	10~20
4.5	4.0~4.5	1.2	190~230	22~24	45~55	10~20

10.3 Parameters for fillet welding in the vertical position

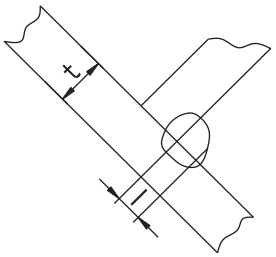
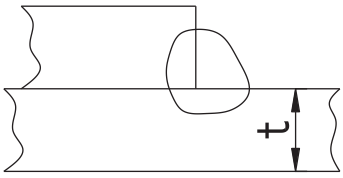
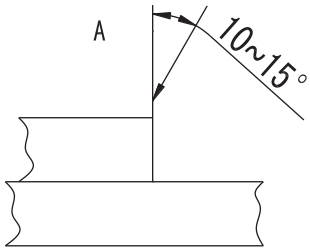


Plate thickness t(mm)	Corner size l (mm)	Wire diameter φ(mm)	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)	Gas volume (L/min)
1.2	2.5~3.0	1.0	70~100	18-19	50~60	10~15
1.6	2.5~3.0	1.0~1.2	90~120	18-20	50~60	10~15
2.0	3.0~3.5	1.0~1.2	100~130	19-20	50~60	10~15
2.3	3.0~3.5	1.0~1.2	120~140	19-21	50~60	10~20
3.2	3.0~4.0	1.0~1.2	130~170	21-22	45~55	10~20
4.5	4.0~4.5	1.2	200~250	23-25	45~55	10~20

10.4 Parameters for lap welding





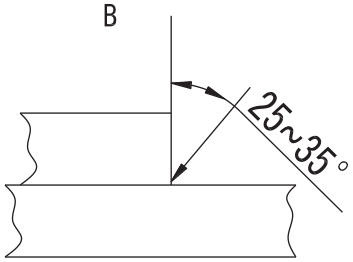


Plate thickness t(mm)	Welding position	Wire diameter φ(mm)	Welding current (A)	Welding voltage (V)	Welding speed (cm/min)	Gas volume (L/min)
1.2	A	1.0	80-100	18-19	45~55	10~15
1.6	A	1.0 ~ 1.2	100~120	18-20	45~55	10~15
2.0	Aor B	1.0 ~ 1.2	100~130	18-20	45~55	15~20
2.3	B	1.0~ 1.2	120~140	19-21	45~50	15~20
3.2	B	1.0 ~ 1.2	130~160	19-22	45~50	15~20
4.5	B	1.2	150~200	21-24	40~45	15~20

10.5 Parameters for mixed gas welding (MAG)

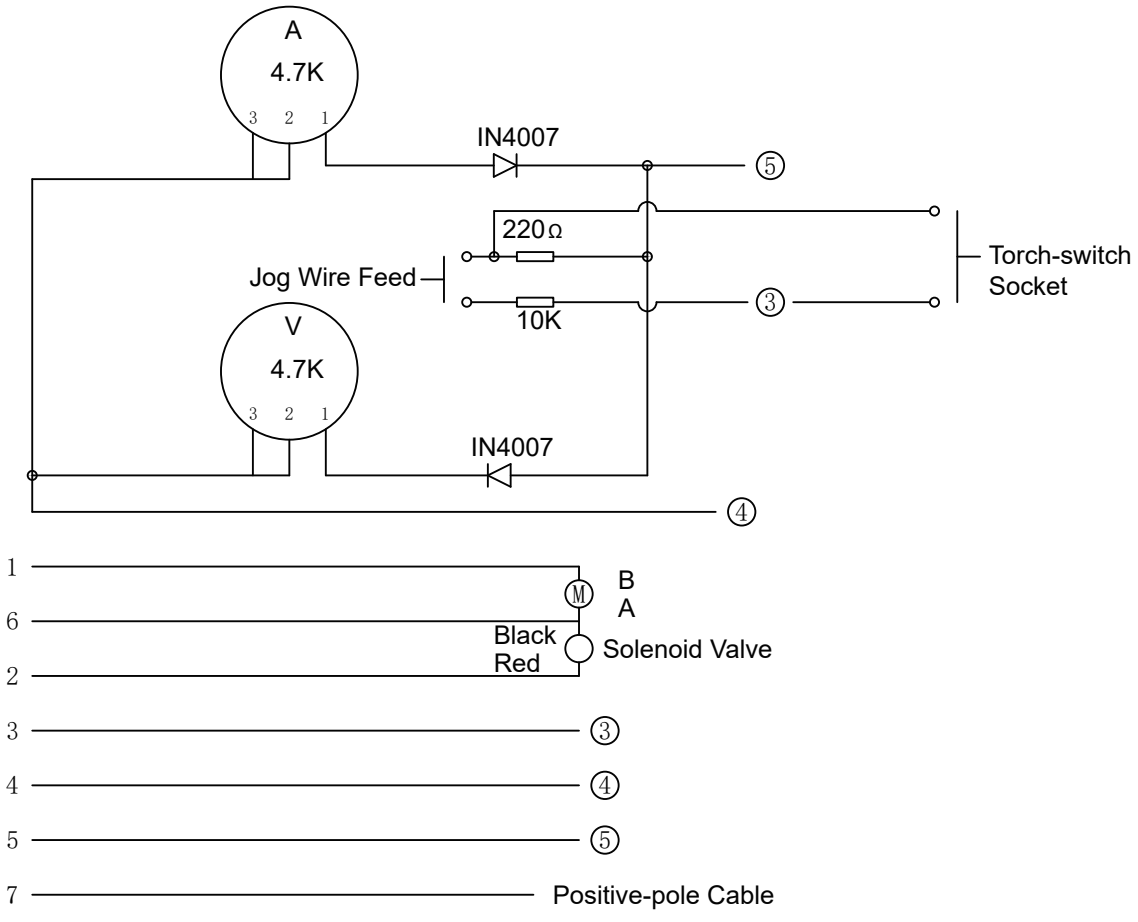
Material: Carbon steel

Gas: Ar+CO_2 mixed gas (10 ～ 15L/min)

Junction type	Plate thickness (mm)	Wire diameter φ(mm)	Gap g(mm)	Welding condition		
				current (A)	voltage (V)	Gas volume (L/min)
"I" type	1.0	1.0	0	50~55	13~15	40~55
	1.2	1.0	0	60~70	14~16	30~50
	1.6	1.0	0	100~110	16~17	40~60
	2.3	1.0or 1.2	0~1.0	110~120	17~18	30~40
	3.2	1.0 or 1.2	1.0~1.5	120~140	17~19	25~30
	4.0	1.2	1.5~2.0	150~170	18~21	25~40

This machine is in continuous improvement, so other parts may be different except the function and operation. Your understanding would be greatly appreciated.

Appendix: Wire Feeder and Machine Wiring Diagram



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