WELDING AND CUTTING TOTAL SOLUTION

OWNER'S MANUAL

SUPERMATRIX 500III

⚠ WARNING:

Read carefully and understand all **ASSEMBLY AND OPERATION INSTRUCTIONS** before operating. Failure to follow the safety rules and other basic safety precautions may result in serious personal injury.

Summary

SUPERMATRIX 500III MIG welding machine , focus on the efficient and high-quality welding of all kinds of metal materials. It uses high performance micro-controller as the core processor, to monitor and coordinate each unit of welding machine and the welding process in real-time, so as to obtain the stable, reliable and excellent welding effect , and ensure a high degree of consistency of each welder.

Tab.1 Main performance of SUPERMATRIX 500III

Multi-Welding Mode :	**Multi-Operation Mode:**
● DC MIG/MAG ● Pulse MIG/MAG ● Duplex Pulse MIG/MAG ● MMA	● Spot ● 2T ● SP. 2T ● 4T ● SP. 4T ● Defined
Welding Materials:	**Protective Gas:**
● Carbon Steel(70S-6) ● Stainless Steel(316/308L) ● Al-Mg(5356) ● Al-Si(4043) ● Al(1100) ● Defined	● 100% CO_2 ● 82%Ar18%CO_2 ● 98%Ar2%CO_2 ● 100%Ar ● Defined

Wire Diameter: ● φ0.8 ● φ1.0 ● φ1.2 ● φ1.6 ● Defined	**Synergistic Adjustment:** ● MIG/MAG Synergistic Database ● Pulse MIG/MAG Synergistic Database ● Duplex Pulse MIG/MAG Synergistic Database
Management of welding program and welding process channel: ● Support welding program No. inquiry and invoking, easy for automatic welding, robot and cluster management, etc. ● Support storage and invoking of more than 100 welding process channels	**Analog welding robot interface:** ● Use the whole isolation way and can connect to all kinds of robot
Friendly Human-Computer Interaction Interface: ● Graphical coordinate panel ● Single knob stepless digital adjustment ● Two triple-digit display	**Full Digital Control Wire Feeder:** ● High consistency, and freely interchangeable ● Two triple-digit display, two knobs stepless digital adjustment, easy to operate

1. Technical Characteristics

Tab.2 Main Parameters of SUPERMATRIX 500III

Input voltage	3×400V±20%（50～60Hz）
Fuse capacity	60A
Rated output	500A/40V
Rated open circuit voltage	80V±5%
Duty cycle	40%，500A40V@40℃
Power factor	COSφ≥0.80
Efficiency	η≥80%
Cooling way	Air cooling
Insulation class	F
Cover protection level	IP21S
MMA welding current adjustment range	10～500A
MMA arc force range	0～100%
MMA arc-start current	10～500A
MMA arc-start time	0～0.99s
MMA arc breaking voltage	40.0～80.0V
MIG/MAG Gas pre/post-flow	0～9.9s
MIG/MAG operation mode	5 types
MIG/MAG speed(wire feed)	1.0m/min～20.0m/min

MIG/MAG current	30～500A
MIG/MAG welding voltage	12.0～40.0V
MIG/MAG arc force	-15～+15%
MIG/MAG upward/downward time	0.1～9.9s
Torch connecting method	Euros
Max diameter of wire spool	200/S300，300mm
Wire diameter	0.8～1.6mm
Wire feeder cover size(L*W*H)	752×279×470
Weight(KG)	16.9(Without spool and cable)
Power source size(L*W*H)	718×308×571
Weight(KG)	47
Water cooler size(L*W*H)	724×308×330
Weight(KG)	24.5(Empty)
Assembly size(L*W*H)	1133×498×1508(With tractor, water cooler, power source and wire feeder)

2. Machine structure and panel function parts

2.1 Machine structure

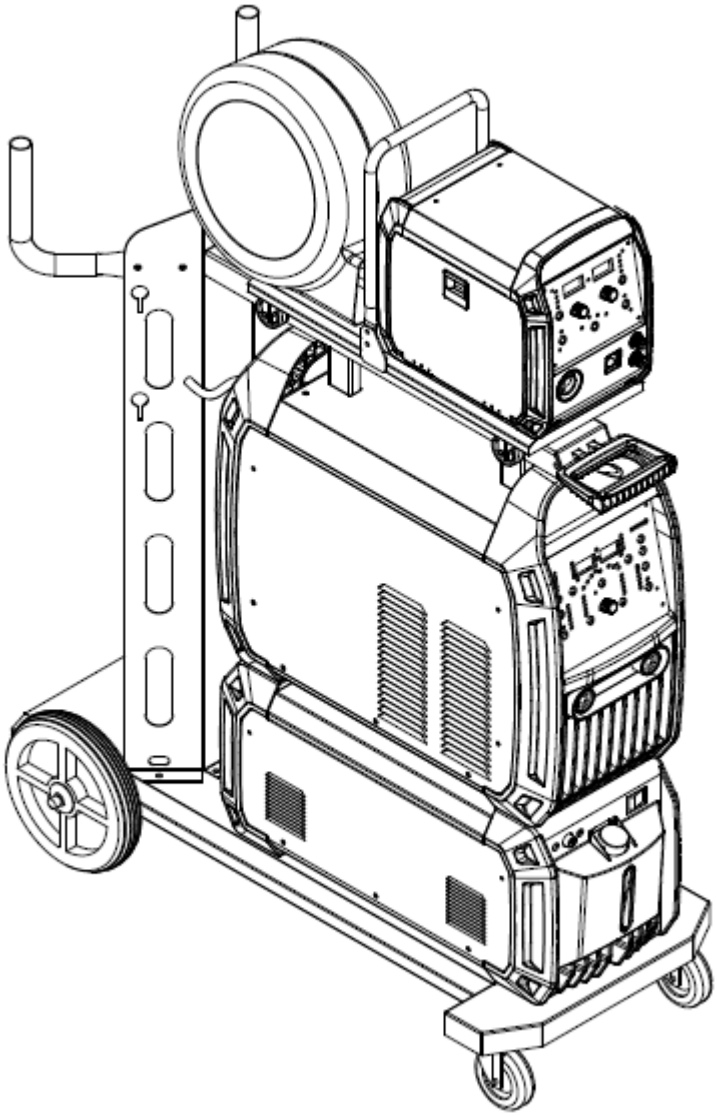


Fig.2.1Main structure sketch

illustration： Above is configuration of SUPERMATRIX500 pulse (without torch, welding cable and connecting cable), devices purchased by customers may also be only part of it.

2.2 Front panel parts

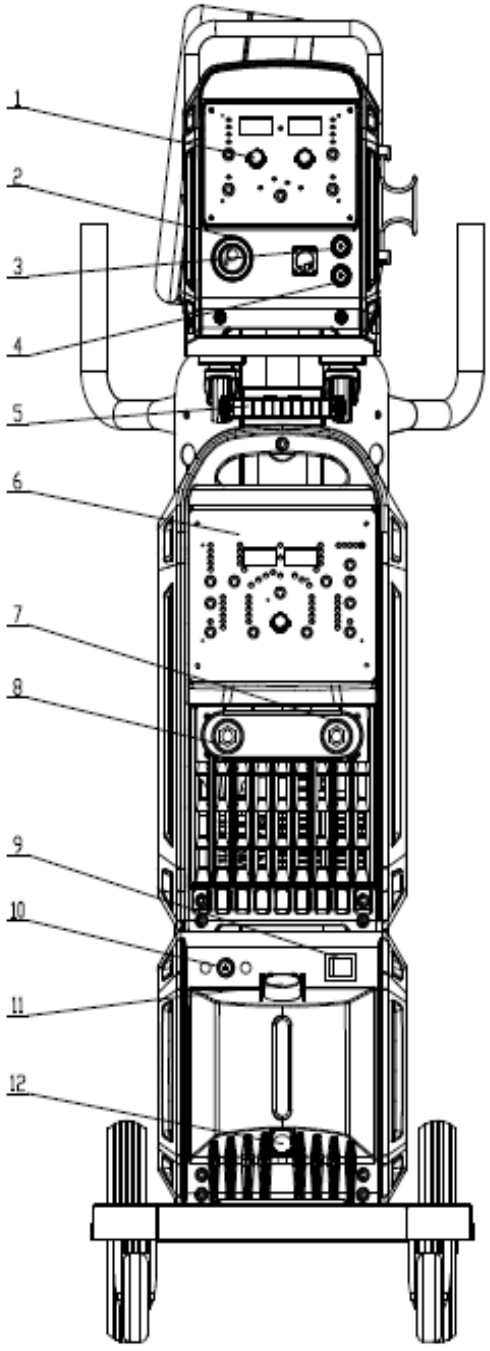


Fig.3.2 Front panel sketch

1. Wire feeder panel
2. MIG Torch plug
3. Outlet of water cooling tor ch(Red)
4. Inlet of water cooling torch(Blue)
5. Handle
6. Power source panel
7. Negative pole
8. Positive pole
9. Water cooler power switch
10. Fuse of water cooler power(3A)
11. Water cooler inlet
12. Water cooler outlet

Remark: Power source is the main engine.

2.3 Back panel parts

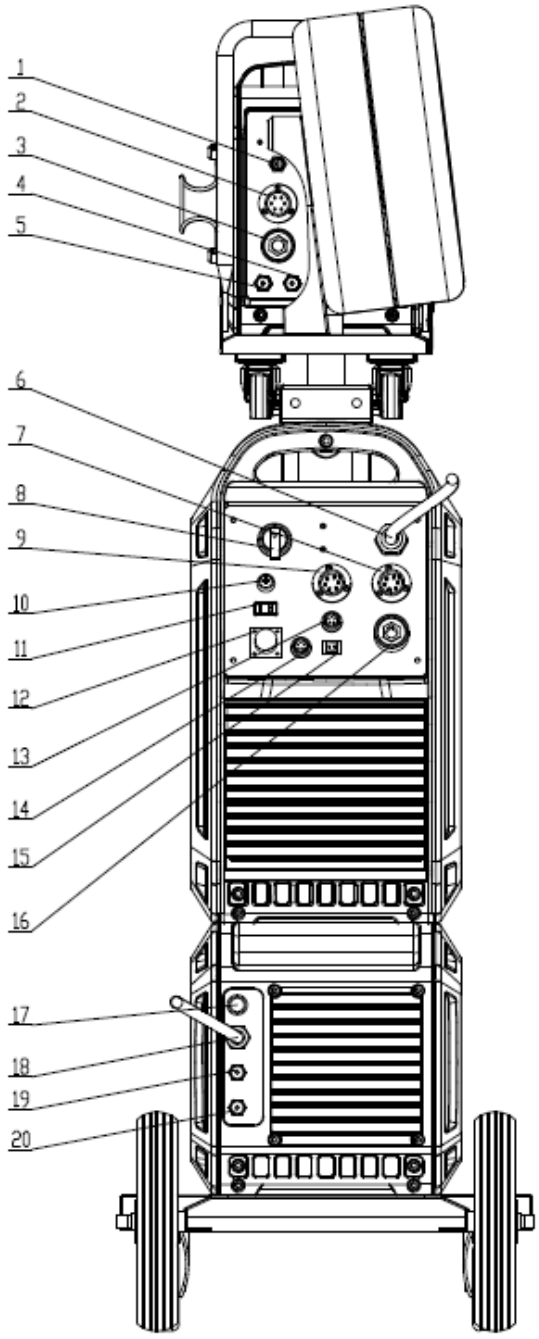


Fig.3.3 Back panel sketch

1.Air inlet joint of wire feeder

2.Wire feeder control cable socket

3.Wire feeder welding cable socket

4. Inlet(Blue)

5.Outlet(Red)

6.3Ph Power cable

7.Power source control cable socket

8. Power switch

9. Robot digital Connector

10. Control power fuse(3A)

11. CO2 heater socket
(for 36V/120W heater)

12. Water cooler power
socket(400V50HZ)

13.Robot digital connector

14.Water cooling signal (A closed contact input for normal flow)

15. “Water/Air cooling” Switch

16. Positive pole on back panel

17. The flow signal outlet socket

18. Water cooler power cable

19. Water cooler inlet
(Red)

120. Water cooler outlet (Blue)

Remark: Power source is the main engine.

3. Control panel layout and parts

4.1 Machine panel

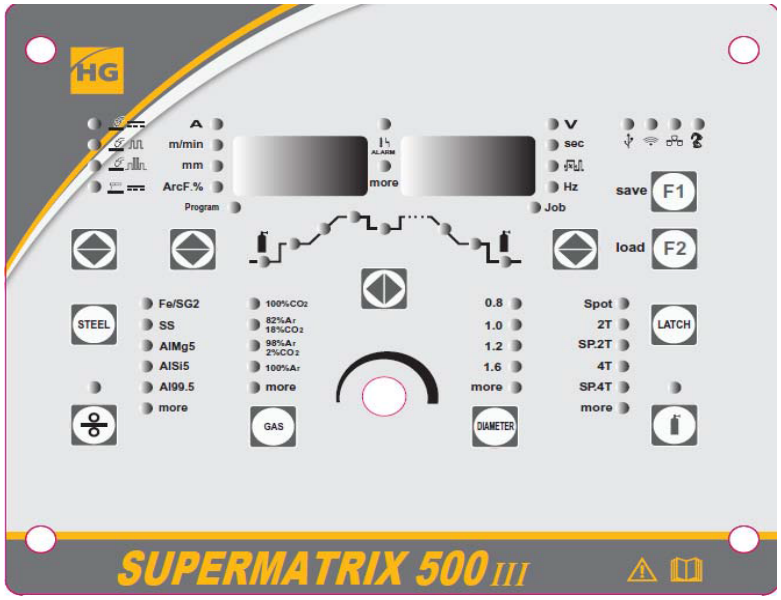


Fig. 4.1.1 SUPERMATRIX 500III Machine panel sketch

(Note: Your device may be slightly different with above)

Fig.4.1.2 **Welding mode**

This part includes welding mode indicator and selection key. Welding options include DC MIG/MAG, PULS MIG/MAG, DUPLEX PULS MIG/MAG and MMA, pressing the selection key can choose the welding mode circularly, and the corresponding way of the indicating lamp is the current

selected welding mode. Remark: during welding (if welding current), the indicator shines.

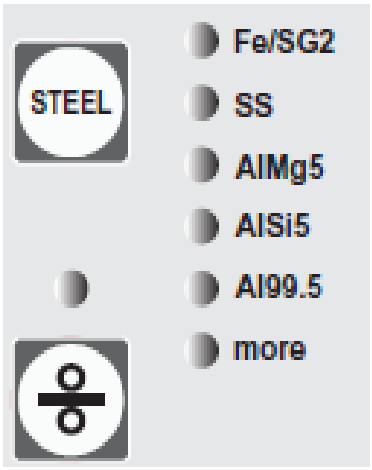


Fig.4.1.3 **Materials selection**

Including indicator and selection keys. Materials include carbon steel(70S-6), stainless(316/308L), Al-Mg(5356),Al-Si(4043),Al(1100) and defined, pressing the selection key can choose the materials circularly, and the corresponding way of the indicating lamp is the current selected materials.

Note: MMA no these functions.

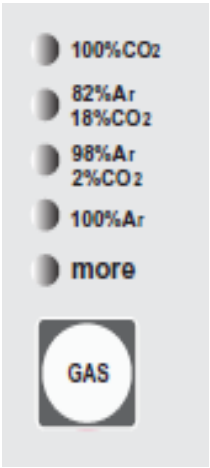
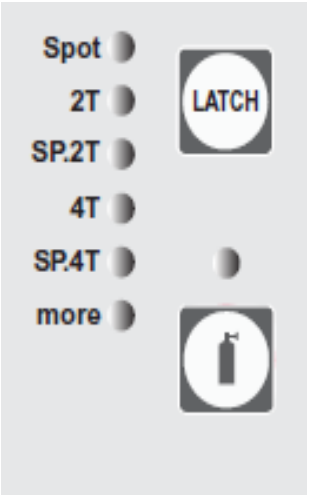


Fig.4.1.4 **Gas selection**

Including indicator and selection keys. Gas includes 100%CO_2, 82%Ar18%CO_2, 98%Ar2%CO_2, 100%Ar, and defined, pressing the selection key can choose the gas circularly, and the corresponding way of the indicating lamp is the current selected gas.

Note: MMA no these functions.

	
Fig.4.1.5 Wire diameter selection Including indicator and selection keys. Diameters include ¢ 0.8, ¢ 1.0, ¢ 1.2, ¢ 1.6 and defined, pressing the selection key can choose the diameter circularly, and the corresponding way of the indicating lamp is the current selected diameter. Note: MMA no these functions.	Fig.4.1.6 Operation mode selection Including indicator and selection keys. Operation modes include spot, 2T, SP 2T, 4T, SP4T and defined, pressing the selection key can choose the operation mode circularly, and the corresponding way of the indicating lamp is the current selected operation mode. The detailed description of operation mode, see table 5-7, MIG/MAG, operation mode definition. Note: MMA no these functions.

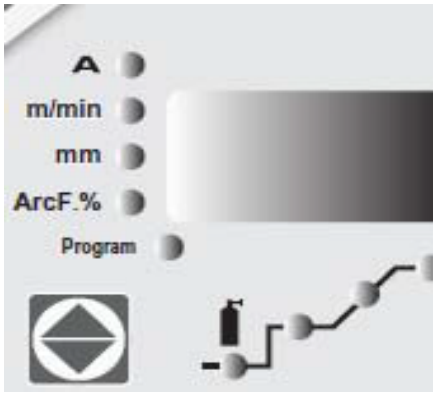
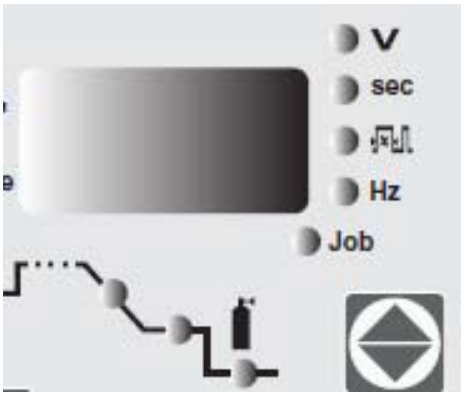
	

Fig.4.1.7 Current column parameter selection Including urrent digital display, indicator and left selection key, parameters include current (A), wire feed speed (m/min), base metal thickness (mm), arc force (%) and welding program. The display can show system information, actual current and other parameters. Pressing the selection key can choose the parameters circularly, and the corresponding way of the indicating lamp is the current selected parameter, and the display can show the value of the parameter. Note: The	Fig.4.1.8 Voltage column parameter selection Including voltage digital display, indicator, right selection key, parameters include voltage (V), time(S), duty cycle (%, only duplex pulse), frequency (HZ) and JOB. The voltage display can show system information, actual voltage and other parameters. Pressing the selection key can choose the parameters circularly, and the corresponding way of the indicating lamp is the current selected parameter, and the display can show the value of the parameter.

current display will show the average value of the actual current when the power on. If you want to change a parameter, you can press the left selection key to let the indicator shine.	Note: The current display will show the average value of the actual voltage when the power on. If you want to change a parameter, you can press the right selection key to let the indicator shine.

About welding “Program”

In the current column parameters, there is an option and parameter called “program”, which indicates a number of the welding environment, for example, the program number “14” means a welding environmental “ MIG+ Carbon steel 70S-6+82%Ar18%CO_2 + wire diameter Φ1.2”, only inquiries cannot be modified and different batch machines may have different program numbers. Welding program number is mainly used in automatic welding, robot welding, welding network and so on.

Fig. 4.1.9 Parameter adjustment knob

Including parameter adjustment knobs. All kinds of welding parameters are set by adjusting knob.

Fig.4.1.10 Welding parameters keeping

Within 5s after welding process is over, keep the indicator on, the current and voltage display will show the actual current and voltage at the end of welding state.

Fig.4.1.11 Parameters selection at welding state

Including indicator, middle selection key. The parameters include pre-state parameters(gas pre-flow),init-state parameters(init current, init wire feed speed, MMA arc-start current and arc-start time), upward state parameters(upward time), main weld state parameters(time, set current or peak current and set wire feed speed during duplex pulse or set wire feed speed, base metal thickness, arc force, set voltage during duplex pulse or set voltage on duplex pulse, duty cycle on duplex pulse, or frequency and channel on duplex pulse), main weld state base parameters(base current, base wire feed speed, base voltage and so on), downward state parameters(downward time), crater-arc state parameters(crater-arc current, crater-arc wire feed speed, crater-arc voltage and so on), and post

parameters(gas post-flow). Pressing the middle selection key you can choose the process parameters circularly, and the corresponding way of the indicating lamp is the current selected process. There are maybe no selected parameters or many parameters, the process without parameters will not be selected, and the selected process has at least one parameters. If you want to choose the parameters that are ultimately displayed or adjusted, you need to make a secondary choice through the current column or the voltage column. Note: There are different selected processes on different operation mode.

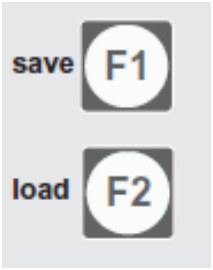


Fig. 4.1.12 JOB management

Including 2 main parts: Save key F1 and load key F2. There are also other parts in JOB management. The easiest process for channel operations is to select the channel number first, press the F1 to store, and press the F2 to call. More illustration as follow:

In order to facilitate users in process specification management, this machine introduced a powerful and simple channel management function. JOB is a cluster or sequence of all kinds of parameters, for example, for MIG/MAG , its specification includes materials, gas , wire, operation mode,

gas pre-flow, init current, init speed, init voltage, upward time, welding current, main speed, base metal thickness, spot time, downward time, crater-arc current, crater arc speed, crater arc voltage, gas post time, and so on, these parameters constitute a process database channel or called JOB. The channel (JOB) is represented by the channel number and the channel number can be understood as the storage location of the channel data in the system. There are two kinds of channel, working channel and specialist channel, working channel is the channel under working, specialist channel is the channel that we can call the optimized data.

The working channel of this machine is private, its channel number is always “0”, it means the machine usually works in the channel 0, and in all combinations consists of base metal, gas, and wire parameters, common MIG/MAG and pulse MIG/MAG has the channel 0, or various combinations of working JOB has its own storage location, MMA also has its own channel 0, channel 0 doesn’t need to store by yourself, the system will store automatically after changing the parameters in seconds. MIG/MAG, pulse MIG/MAG, duplex pulse MIG/MAG share hundreds of specialist channels, the specialist channels has the public property, it means working channels can be stores in any specialist channels, and can call any specialist channel into working channel except MMA. The methods storing working channel into one specialist channel: press middle selection key to make the welding parameters to “main welding parameters”, press the right selection key to

make the voltage column to “JOB”, at this moment the voltage display show the channel number, adjusting knob is at the needed specialist channel (cannot be 0), you can press “F1” to store (the current will show S if storing). The method calling specialist channel into working channel: press middle selection key to make the voltage column to “JOB”, at this moment the voltage display will show the channel number, the adjusting knob is at the needed specialist channel(cannot be 0), press”F2” you can call(the current display will show L).

Note: Your device may be slightly different with above!

Fig.4.1.13 On-line status indication

USB indicator, on-line light on, out-line light off;

WiFi indicator, on-line light on, out-line light off;

Ethernet indicator, on-line light on, out-line light off;以

Robot controlling or connecting indicator, on-line light on, out-line light off;

Note: these functions are additional configuration, not available in factory setting!

Fig.4.1.14 Abnormal information

Including current display, voltage display and abnormal alarm indicator. All kinds of abnormal situation will take place after power on, this area can reflect the situation of machine in time to help users deal with it . If there is abnormality, the alarm indicator shines, and the current display will show “Err” and the voltage display will show error code. For more information about abnormality and its handling methods, see table 7-1.

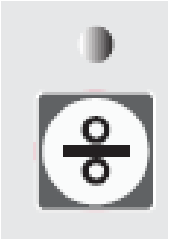


Fig. 4.1.15 Wire check

Including wire check key, wire feed indicator and so on. Press once the wire check key, the wire feeder works at current set speed, press again the feeder stop working. You can change the speed through adjusting knob during wire checking and it won’t affect the set speed. The indicator always shows the start/ stop status. Note: You can press the

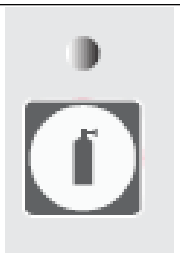


Fig.4.1.16 Gas check

Including gas check key, gas flow indicator and so on. Press once the gas check key, the gas circuit open, press again the gas circuit close. The indicator always shows the open/ close status of gas circuit.

Note: You can press the torch switch to end gas flow during gas checking.

torch switch to end wire feeding during wire checking.	

4.2 Wire feeder panel

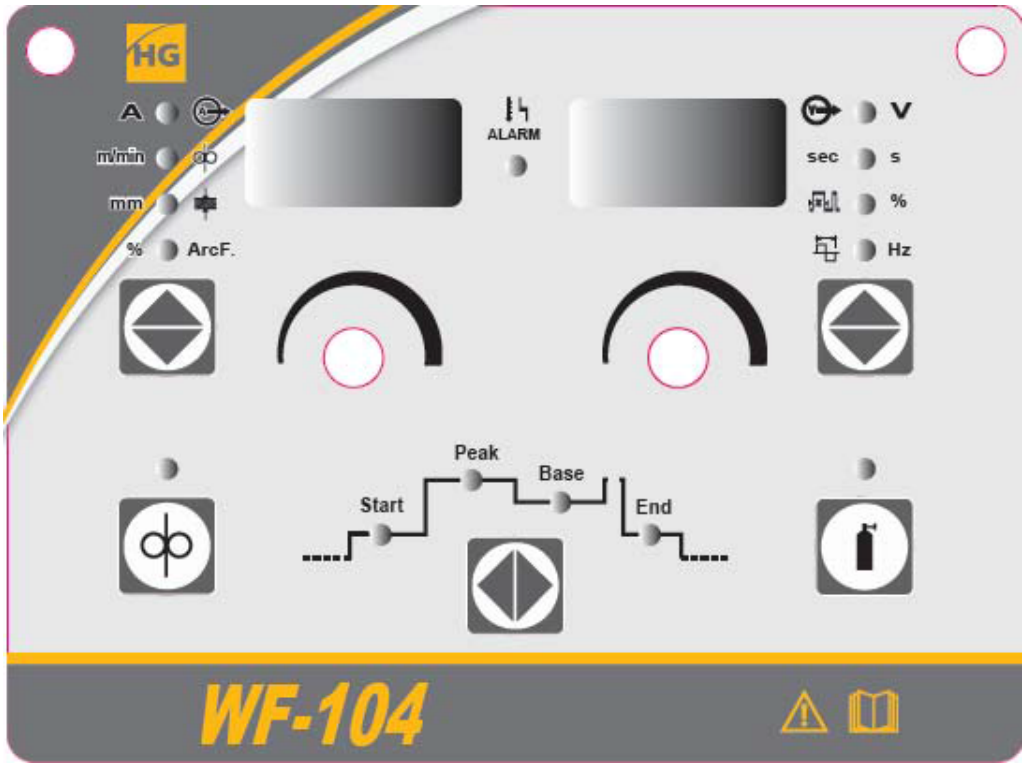


Fig. 4.2.1 WF-100 panel sketch

Fig.4.2.2 Current column parameters	Fig.4.2.3 Voltage column parameters
Including current display, indicator, left selection key and left knob etc, parameters of current column include current(A), wire feeder speed(m/min), base metal thickness(mm) and arc force(%) etc. The current digital display can show system information, actual welding current and column parameters. Press selection key can choose circularly column parameters, the corresponding parameter of the indicator lighted is the selected parameter, and current display will show current parameter. Note: display window may show real current at welding.	Including voltage display, indicator, right selection key and right knob etc, voltage column parameters include voltage (V), time(s), duty cycle (%, duplex pulse), frequency (Hz, duplex pulse). The voltage digital display can show system information, actual welding voltage and column parameters. Press selection key can choose circularly column parameters, the corresponding parameter of the indicator lighted is the selected parameter, and voltage display will show it.

Fig.4.2.4 Wire check

Illustration as Fig.4.1.15。

Fig.4.2.5 Gas check

Illustration as Fig.4.1.16。

Fig.4.2.6 abnormal information

Including current digital display, voltage digital display and abnormal indicator. Alarm indicator will shine with red light at the situation of abnormal, Character “Err” will be showed in current digital display, and abnormal code will be showed in voltage digital display. The detailed description of abnormal information and handling method refer to Tab.7.1

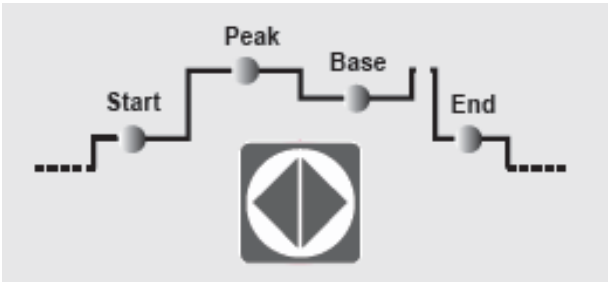


Fig.4.2.7 Process parameters selection

Including process parameters indicator, middle selection key. Process parameters include init state(init current, init wire feed speed , init voltage), Weld state peak parameters(time, setting current or peak current with mode duplex pulse, setting wire feed speed or wire feed peak speed

with mode duplex pulse, base metal thickness, arc force, setting voltage or peak voltage with mode duplex pulse, duplex pulse's duty cycle, duplex pulse's frequency etc), weld state base parameters(base current, base wire feed speed, base voltage etc), crater-arc state parameters(crater-arc current, crater-arc wire feed speed, crater-arc voltage etc). Press middle key can choose circularly process segment parameters, the corresponding segment of the indicator lighted is the selected segment. Some segment may be no parameters or several parameters, the segment no parameter will not be selected, the selected segment has one parameters at least. It needs to select twice in current or voltage column to choose what parameters you want. Note: Different operation way may have different optional segment.

Factory setting

1. When the machine function is adjustable, below process can help to solved the problems by returning to factory setting
2. PRESS and HOLD "F1", then Press "**Middle**selection bottom" at same time to entry factory setting mode.
3. When both display shown "0", this mean entering factory mode successfully.

4. During factory setting mode (both display shown "0"), switch to voltage by pressing **Right selection bottom(not middle selection bottom)**,when the "V" indicator is flashing, turn the knob to tunnel "9", then press "F1" again to save it.
5. Reboot, machine returned to factory setting.

Caution! Only "tunnel 9 can be adjusted", adjusting on other tunnel will lead to unpredictable situations!

When incidentally adjust to wrong tunnel during factory mode, DO NOT press F1 to save setting, just press "selection bottom" leave factory mode and reboot.