



AristoTig 400 AC/DC ***DTD 400 AC DC***

Instruction manual

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!WARNING!

ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURER'S HAZARD DATA .

!ELECTRIC SHOCK - CAN KILL!

- * Install and earth the welding or cutting equipment in accordance with applicable standards.
- * Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- * Insulate yourself from earth and workpiece.
- * Ensure that your working place is safe.

!FUMES AND GASES - CAN BE DANGEROUS TO HEALTH!

- * Keep your head out of the fumes.
- * Use ventilation, extraction of fumes at the arc or both to keep fumes and gases out of your breathing zone and the general area.

!ARC RAYS - CAN INJURE EYES AND BURN SKIN!

- * Protect your eyes and body. Use the correct welding screen and filter lens and wear protective, insulating and non-flammable clothing.
- * Protect bystanders with suitable screens or curtains.

!FIRE HAZARD!

- * Sparks and spatters can cause fire. Make sure, that there is no inflammable material in the surrounding of welding and cutting works.

!MALFUNCTION!

- * Call for expert assistance in the event of malfunction.

Read and understand the instruction manual before installation and operation

!Protect yourself and others!

TECHNICAL DESCRIPTION

ARISTOTIG 400 AC/DC is a most compact double current power supply for TIG-welding and Manual Metal Arc-welding (MMA).

"State of the art" IGBT-inverter technology, intelligent control, fastest response speed and a consequent modular way of construction leads to a unique relation between power and weight at a high duty cycle, highest precision in TIG-welding and best arc-characteristics in MMA-welding of all types of electrodes.

Due to the high switching frequency of 40 kHz of the DC-module (base-module) fastest reaction speed is achieved and leads to highest precision and arc-stability over the whole current range.

The AC-module, connected in series to the DC-module, is creating the alternating current in that way, that polarity change is done in such a short time that reignition of the arc is achieved without HF-support in the whole current range.

The cooperation of DC- and AC-module allows different wave forms on AC such as true square wave to sinus wave without loosing the fast polarity change and reignition without HF-support.

The clearly arranged control, by symboles easily to understand, allows a fast grip to the manifold functions of control and setup.

DTD 400 AC/DC Technical Data

TDDTD400.doc

	Mains voltage	(V) 3-phase	400 +/- 10% 50/60 Hz
M	Permanent power	(kVA)	14,6
A	Max. power	(kVA)	20,0
	Permanent current	(A)	21,0
I	Max. current	(A)	29,0
	Power factor cos phi		0,94
N	Efficiency		0,80
S	Frequency	(Hz)	50/60
	Fuses, slow blow	(A)	32
W	Current range	DC	5-400 A
		AC	10-400 A
E	Duty cycle (10 min cycle)	TIG	60% at 400 A 100% at 310 A
L		MMA	60% at 400 A
D		MMA	100% at 310 A
I	Open circuit voltage	AC and DC	90V DC
N			
G			
C	Dimensions	(mm) L/W/H	780/700/1070
O	Weight	(kg)	97
N	Protection class		IP 23
S	Cooling		F
T	Insulation class		F
R	Standards		EN 60974-1
U			VDE 0544-1
C			EN 50199
T	S-Mark		Yes
I	CE-mark		Yes
O			
N			

INSTALLATION

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ARISTOTIG 400 AC/DC is supplied connected for 400 V 50/60 Hz. Mains voltage tolerances are accepted from + 10% to - 10%. greater tolerances will lead to a fault indication.

The mains plug must comply to country regulations and must be connected by an electrician. Check the mains voltage before the machine is switched on.

The welding cable for MMA and the work return lead for TIG and MMA should have a cross section of at least 70 mm². Check that all cables and connections are correctly fitted.

Secure a gas bottle on the gas-shelf always with the chain.

The welding equipment creates a noise level of < 70 dB(A) at idle.

An emission level related to the work-place cannot be stated, because this value is depending on the method and the surroundings. It is conditioned by a variety of parameters e.g. the welding or cutting process, the kind of current, the power, the kind of material, resonances of the workpiece, the surroundings and more.

OPERATION

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All controls and connections are located with easy access on the front of the machine.(see pages 50,51)

A: Control functions

- | | | | |
|----|-----------------------|-----|--|
| 1. | Green LED's | 1a: | Shows the mains voltage, when the machine is switched on. |
| | | 1b: | Lights up, when OCV or welding voltage is supplied to the outlets. |
| | | 1c: | Shows the function of the safety circuit. It is dark, when inadmissible open circuit voltage ($U > 48$ V AC) is supplied to the outlets.
The function of the safety circuit can be tested as follows:
1. Set the mode switch 2 in position 'MMA',
2. Set the polarity switch 10 in position DC with negative polarity.
While manually changing the polarity from DC-minus to DC-plus and vice versa the LED 1c must be extinguished for a short time. |
| 2. | Mode switch | 2: | To change the welding mode:
MMA
TIG 2-stroke
TIG 4-stroke
TIG 4-stroke with pilot function (manual pulsing). |
| 3. | Ignition switch | 3: | To change the kind of ignition:
HF-Ignition
Lift-Arc Ignition. |
| 4. | Current mode switch | 4: | To change the current mode:
Non pulsed welding in AC and DC; TIG and MMA
Pulsed welding with straight pulses; AC and DC; TIG and MMA
Pulsed welding with soft pulses; AC and DC; TIG and MMA. |
| 5. | Potentiometer | 5: | To set the up-slope time from 0 to 10 seconds. |
| 6. | Current potentiometer | 6: | To set the welding current for non-pulsed welding or the pulse-current for pulsed welding |
| 7. | Current potentiometer | 7: | To set the base-current for pulsed welding or the pilot current in percentage (10-90%) of the pulse- or welding current. |

8.	Potentiometer	8:	To set the down-slope time from 0 to 10 seconds.
9.	Potentiometer	9:	To set the gas-post-flow time from 0 to 30 seconds.
10.	Polarity switch	10:	5 position switch to select at the electrode: * AC with approximated sine wave current * AC with square wave current * DC with straight polarity * DC with reverse polarity * DC with straight polarity, but with reverse ignition polarity This function only should be used on MMA or on TIG-welding with big tungsten diameters and high currents.
11.	Frequency control	11:	This potentiometer fulfills a double function: a) To set the pulse frequency from 0,3 to 300 Hz during pulsing; b) To set the AC-frequency from 30 to 300 Hz during non-pulsed AC-welding in the current range up to 200 A. In the the current range up to 400 A the maximum of the AC-frequency is limited to 200 Hz. Note: When pulsed AC is selected, the AC-frequency is automatically fixed to 100 Hz! The highest selectable pulse-frequency is 100 Hz in this case!
12.	Balance control	12:	This potentiometer also fulfills a double function: a) To set the time balance between pulse- and base-current during pulse welding; b) To set the AC-balance of positive or negative half wave to achieve either optimized cleaning or penetration. Note: When pulsed AC is selected, the AC-balance is automatically fixed to 50/50%.
13.	Current range selector	13:	To use also the lower amperage range in an optimized way, this selector allows to choose two ranges of current settings: 5-200 A and 10-400 A.
14.	Digital amperemeter	14:	To preselect the welding current and to show the current.
15.	Potentiometer Hot-Start	15:	To set and to optimize the Hot-Start function in TIG and MMA.
16.	Potentiometer Arc.Force	16:	To set and optimize the Arc-Force function only in MMA.
17.	Fault indication	17:	Shows faults as: Overtemperature of the power supply, Exceeding the mains voltage tolerances. No water flow in the torch-cooling

B: Connections

18. Main switch	18:	To switch the mains supply on or off. In position I the fans are started with reduced rotation speed and the machine is ready for operation.
19. OKC-connector Plus	19:	For the connection of the work-return lead or the electrode holder.
20. OKC-connector Minus	20:	For the connection of the electrode-holder.
21. TIG central connector	21:	Quick connector for current, gas and control cable.
22. Socket control cable	22:	To connect the torch control cable
23. Remote control socket	23:	To connect a remote control
24. Gas nipple	24:	To connect shielding gas from the regulator. (rear side of machine)
25. Mains cable input 23:	25	Rear side of machine

WELDING

Attention: During stand by, speed of fans is reduced. When igniting an arc, rotation speed is automatically increased. This results in increased noise level during welding. When welding is stopped, and the machine has cooled down, rotation speed is again reduced automatically.
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TIG-welding with DC output

- * Check that TIG-torch and work return lead are connected correctly.
- * Check that the right alloyed tungsten electrodes is used and that the electrode is ground at an included angle of 40°.
- * **Check that there is free air flow through the machine.**

Set main switch to position I. LED 1a and LED 1c are illuminated, cooling fans are started with reduced rotation speed. Meanwhile the temperature control diode and the control diode for under- and overvoltage are lighted. This indicates an internal check of the whole machine control. The yellow LED cuts out after app. 5 seconds; the red one after app. 30 seconds. The machine is ready for operation when the yellow control LED is disilluminated.

On TIG-welding three operation modes are possible:

1. 2-stroke mode,
2. 4-stroke mode.
3. 4-stroke mode with manual pulsing (pilot function), which means. that with short touching of the torch switch a change between two adjustable currents is possible. A torch with a double switch is not a must.

ATTENTION: The choice of automatic pulsing always overrides the choice of manual pulsing.

Set switch 2 to one of the desired postions TIG and the polarity switch 10 to position DC with negative polarity.

Set switch 3 to the desired ignition mode.

Set switch pulsing 4 to the desired position. You may weld as well non-pulsed, as pulsed with "hard" pulses as pulsed with "soft" pulses.

The welding current is set by potentiometer 6. Using one of the pulse welding modes this value is the pulse-current, whilst the base current is set by potentiometer 7 in percent of the pulse-current.

If a pulsed process has been set, you can now adjust by potentiometer 11 the pulse frequency and the time balance between pulse and base current by potentiometer 12.

By potentiometers 5, 8 and 9 you can set up-slope time, down- slope time and gas post flow time.

Using a foot remote control, it is plugged into socket 21 and switch 2 is set to position 2-stroke. Now you may control welding completely by the remote control.

Using a foot remote control, up- and down slope time have to be set to 0!

A hand remote control can be used for current control both in 2-stroke or 4-stroke mode.

TIG-welding with AC output

- * Check that TIG torch and work return lead are connected correctly.
- * Check that the correct alloyed tungsten electrode is used and that the electrode is ground at an included angle of 90°.
- * **Check that there is free air flow through the machine.**

The setting procedure for torch switch function and the mode of ignition is the same as for DC-welding.

Please note, that, if you are setting the switch Pulsing 4 to one of the pulsing modes, the possibility of setting the AC-frequency and the balance control is out of function. Potentiometer 11 is now used to set the pulse frequency and potentiometer 12 to set the time balance between pulse time and background time.

If you are choosing the non-pulsed AC-welding by switch 4, potentiometer 11 may be used to set the AC-frequency and potentiometer 12 to set the balance between positive and negative half-wave.

An increased AC-frequency results in a most stable arc in low currents for welding extreme thin material. The variation of the balance gives an increased cleaning in the positive direction and increased penetration in the negative direction.

By polarity switch 10 two different types of AC can be set:

1. A kind of sinus half waves, resulting in a soft arc and a reduced emission of noise.
2. A square wave AC, resulting in an arc, which is hard and stable but giving more noise emission.

Please note, that the arc is always ignited by a low DC-current, which is automatically switched to AC by the AC-module.

Safety cut out

When the torch trigger or the foot remote control is depressed without striking an arc, HF and open circuit voltage is switched off automatically after 2 seconds.

This safety cut out is also effective when arc interruptions occur.

- Benefits:
- * no uncontrolled arc-striking
 - * no material damage
 - * no dissipation of shielding gas
 - * reduced risk of accidents

MMA-Welding

Stick electrodes can be welded as well with DC as AC, with pulsed current or straight current.

Electrode holder and work return lead are connected to the OKC sockets 19 and 20 marked accordingly.

The switch TIG/MMA 2 must be brought into position MMA. The LED 1 b for the open circuit voltage is illuminated to show, that there is OCV at the outlets.

By potentiometer 6 the desired amperage can be set.

Potentiometer 15 for setting the Hot-start and potentiometer 16 for setting the Arc-force are now in function.

According to the electrode type to be welded, either DC straight polarity or DC reverse polarity or AC can be selected by polarity switch 10 without any reconnection of cables.

Attention: Never lay down the electrode holder uninsulated or with a stick clamped!

Disconnect electrode holder during TIG-welding!

Disconnect TIG-torch during MMA-welding!

Maintenance

This welding equipment has been designed, manufactured and tested to the highest quality standards to ensure long and trouble free life. However, regular maintenance is an essential part of keeping the machine operating in a reliable and safe manner. Your attention is drawn to any maintenance instruction in this manual.

In general, all welding equipment should be thoroughly inspected, cleaned, tested and serviced at least annually. More frequent checking will be required, when the machine is heavily used.

Wear and tear, particularly in electro-mechanical and moving components, are gradual processes. Caught in time, repair costs are low and the benefits in performance, reliability and safety are significant. Left alone, they can put the equipment and you at risk.

Have this equipment regularly inspected and maintained by an approved service center.



