AQTRONIC

aiming for quality

CE RoHS EMC

ALPHA THC Up/Down/Ok

PROFESSIONAL TORCH HEIGHT CONTROL



OPERATION MANUAL

Technical Specifications

Supply Voltage	24 VDC nominal (12–48 VDC)
Current Consumption	120 mA (3W)
Plasma Voltage Input	Photoelectrically isolated
Control Outputs	Optically isolated
Supported Plasma Voltage Ratio	1:1 and 1:50
Anti-Dive Input	Active LOW
Minimum Plasma Voltage	40 VDC
Maximum Plasma Voltage	600 VDC

Optically isolated outputs: **UP, DOWN and OK**. Follow the wiring diagram and the CNC controller documentation.

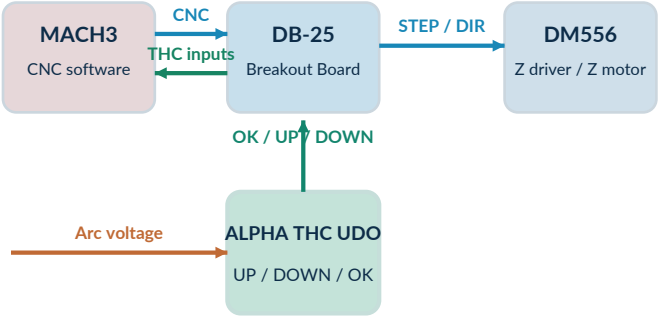
Safety Warning – High Voltage

SAFETY REMINDER: Disconnect and isolate the plasma and CNC supplies before wiring or servicing.

Electric shock can cause serious injury or death. The plasma circuit uses hazardous DC voltages; during cutting, the torch, workpiece and electrically connected components form part of this circuit.

- Do not touch the torch, workpiece, arc-voltage measurement terminals or exposed conductors while the plasma system is energized.
- Before installation, wiring, inspection or maintenance, disconnect the main power to both the plasma unit and CNC. Follow the prescribed isolation/lockout procedure and allow the discharge time specified by the plasma manufacturer.
- The OFF position of a control or switch does not guarantee that all internal circuits are de-energized. Do not open the plasma power supply or work on live circuits unless you are a properly qualified technician.
- Where available, use the manufacturer-provided divided-voltage output for arc-voltage measurement. A direct 1:1 connection must be treated as a high-voltage circuit and requires suitable insulation, wiring and protection.
- Keep your body, gloves, footwear and work area dry. Use suitable insulating equipment and proper grounding according to the plasma manufacturer's instructions and applicable electrical regulations.
- Installation and maintenance must be carried out by personnel familiar with plasma-system hazards. Before operation, also read the safety instructions supplied by the plasma power-source manufacturer.

Signal Path



The CNC software communicates through the DB-25 breakout board to the DM556 Z driver. The UDO measures arc voltage and supplies the isolated OK, UP and DOWN signals to CNC inputs.

The exact connection of UDO outputs to CNC inputs depends on the breakout board documentation.

Up / Down / OK Connection

The diagram at the end of this manual shows the 24 VDC supply, the plasma-voltage measurement input, the optional A-Dive input and the ALPHA THC UDO terminals +24V, GND, COM, OK, DOWN and UP. Connect these signals to the CNC inputs according to the documentation for the specific controller board.

COM

Common terminal for the optically isolated OK, UP and DOWN outputs. Connect it to the appropriate CNC input common. Do not bridge it to the device's negative supply terminal.

OK

Activates when the main cutting arc is detected and the dLy delay has elapsed. Its use as a software input is optional.

UP / DOWN Signals

UP

Commands an upward correction when measured arc voltage is below the target band defined by HyS.

DOWN

Commands a downward correction when measured arc voltage is above the target band defined by HyS.

The outputs do not activate from the pilot arc alone or after the main arc is interrupted. Shielded cable is recommended for signals to the CNC, with the shield grounded at the CNC end.

CNC input wiring

Check the CNC input common and input configuration. Never bridge COM to the device negative supply.

Startup and Target Voltage

After power is applied, the display shows a brief startup sequence and then three dashes (---) when there is no input voltage. On the main display, UP/DOWN changes the Target Voltage. For the other parameters, hold both buttons until HyS appears. Navigate the menu and save a value by holding both buttons again until the display flashes.

TARGET VOLTAGE

This is the desired arc voltage corresponding to the cutting height. It can be adjusted from the main display. Start with the value that produces the correct actual cut height, then make small adjustments during a steady, straight cut.

Parameter Settings I

HyS - Hysteresis

Range: 1–15 V • Factory setting: 1 V

Creates a band around Target Voltage in which UP/DOWN commands remain inactive. A lower value makes height correction more sensitive; a higher value reduces repeated small adjustments.

dLy - Delay

Range: 1–15 s • Factory setting: 1 s

Delays the OK output after detection of the main cutting arc. A longer delay allows more time for piercing and arc stabilization before OK is reported.

CAL - Calibration

Range: −35 to +35 V • Factory setting: 0 V

Corrects a constant voltage-reading offset relative to a reliable external measurement. Use CAL only after comparison with a suitable instrument.

Parameter Settings II

LCU - Low Voltage Cut

Range: 40–99 V • Factory setting: 40 V

Control outputs are disabled below the LCU threshold. Keep this setting below normal cutting arc voltage.

ANT - High Voltage Cut

Range: 0-150 V • Factory setting: 30 V

At the end of a cut or near an edge, Plasma Voltage may rise suddenly. Without protection, the THC may interpret the spike as an excessive cutting height and command the torch downward.

Plasma Voltage > Target Voltage + ANT

Temporary correction suppression

ANT suppresses height corrections when the measured value

exceeds the Target Voltage plus the selected Anti-Dive margin.

tSt - Test

Simulates controller operation with a countdown. The test stops when a button is pressed or automatically after a few seconds.

ESC - Escape

Exits the parameter menu. Alternatively, the device returns to the main display automatically after a few seconds.

ANTI-DIVE

The Anti-Dive input is shown in the connection diagram. When the CNC issues an Anti-Dive signal for selected cutting regions, height control is temporarily suspended to prevent incorrect corrections at corners, small shapes or near the end of a cut. This input is Active LOW. The signal must be configured in the CAM/CNC software being used.

Target Voltage

If the torch moves too close to the workpiece during cutting, gradually increase Target Voltage. If it stays too high, gradually decrease the value until the desired cutting height is achieved.

HyS - Hysteresis

If Z-axis motion makes excessive small corrections, a slight increase in HyS may help. An excessively high value reduces height-control accuracy.

Troubleshooting

dLy - Delay

If the CNC receives OK before the arc has stabilized after piercing, increase dLy to provide more time before the OK output activates.

CAL - Calibration

If the indicated arc voltage consistently differs from a reliable external measurement, check CAL. A small reading difference does not necessarily mean poor height regulation.

LCU - Low Voltage Cut

If a voltage reading appears during standby instead of three dashes, check LCU and possible electrical noise. LCU must remain below the actual arc voltage during normal cutting.

ANT- High Voltage Cut

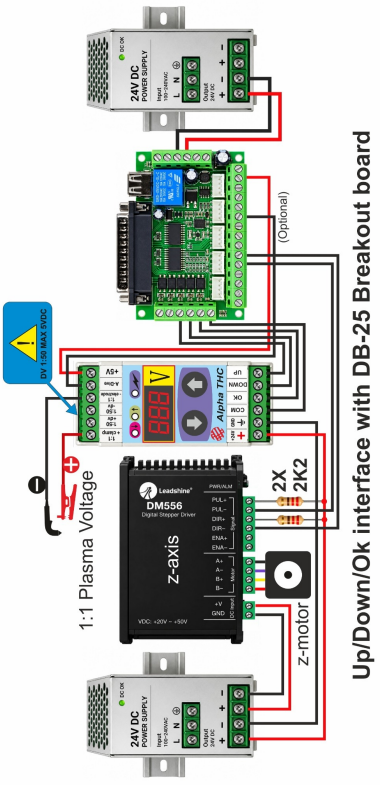
If the voltage rises sharply as cutting stops, check ANT so height corrections stop above the selected limit.

UP / DOWN / OK

If the CNC does not recognize the commands, check the CNC input configuration, the common COM terminal and wiring continuity against the diagram. OK is activated after dLy and is not required for operation.

Connection Diagram

Up / Down / OK with DB-25 breakout board. Rotate the booklet to read the wiring layout.





WWW.AQTRONIC.COM

AQTRONIC Kymi Evia 34003
(Tel) +302193008002
Made in Greece