

TBF PYROTEC

OPERATING INSTRUCTIONS MAGNA FLUVIA FLAME

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OPERATING INSTRUCTIONS

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1. SAFETY INSTRUCTIONS

The following safety instructions are organized by hazard level:

DANGER: Immediately impending danger that will result in death or serious injury.

WARNING: Possible danger that can result in death or serious injury.

CAUTION: Hazardous situation that can result in minor or moderate injury.

NOTICE: Situation that can result in property damage or equipment damage.

DANGER

High Voltage / Ignition Ignition occurs via a high-voltage arc (approx. 7 kV). Contact with live parts can result in serious injury or death.

Electric Shock The device is operated at 110–230 V AC. Work on the opened device may only be performed by qualified specialist personnel.

Emergency Stop / Disconnection The power supply must be able to be interrupted immediately at all times. Emergency-stop and emergency-halt devices must be freely accessible at all times.

Open Flames / Fire Hazard The Magna Fluvia Flame produces open flames at high temperature. Risk of fire and injury throughout the entire effective area.

WARNING

Flammable Fuels The fuels used are highly flammable. There is a risk of fire and explosion.

Hazards

- Ignition by open flames, sparks, or hot surfaces
- Accumulation of vapors near the ground
- Formation of ignitable air-vapor mixtures

Protective measures

- Keep all ignition sources away
- Work only in adequately ventilated areas
- Immediately clean up spilled fuel and ventilate the area
- Use suitable personal protective equipment

Approved fuels

- Isopropanol, ethanol, IsoparH / J / K, diesel, premium gasoline

Notes

- The relevant safety data sheets (SDS) must be read and observed before commissioning. Other fuels may only be used with written approval from TBF-PyroTec.

Safety Area and Triggering Operation is only permitted if the following safety distances are maintained:

- Radius around the device: 4 m
- In the direction of the flame: nozzle S 12 m, nozzle M 18 m, nozzle L 30 m
- Parallel to the flame: 4 m

The effective area covers the entire area in which hazards from flame, heat, or burning fuel can occur.

The effective area corresponds at least to the specified safety distances and may be larger depending on ambient conditions (e.g., wind).

Triggering is only permitted when no persons, animals, or flammable materials are present in the effective area.

Control / DMX DMX is not a safe signal protocol. Faulty triggering cannot be ruled out. Use of the proTEC safety architecture is recommended.

Improper Operation Improper operation or manipulation can lead to malfunctions and uncontrolled triggering. Operation is only permitted by trained specialist personnel. The device must be secured against unauthorized access.

Device Condition Devices with damaged hoses, cables, housings, or seals must not be operated.

Line of Sight The operator must have an unobstructed view of the device, flame outlet, and safety area at all times.

CAUTION

Operation and Approval Use of the device must be approved by the responsible operator and, where applicable, the competent authorities. National regulations must be observed.

Hot Surfaces The burner and surrounding components become hot during operation. Risk of burns during operation and for up to 20 minutes afterward.

Fallout Fallout of fluid residue can occur during operation. Sensitive surfaces must be protected.

Movement of the Device The device must not be moved after filling or during operation.

Ambient Conditions Operation is only permitted within the following ambient temperatures: 5 °C to 45 °C. Operation is not permitted at wind speeds above Beaufort force 7.

Filling with Fuel Conductive, suitable tools must be used when filling. Electrostatic charging must not occur.

NOTICE

Transport and Storage Before transport or storage, the device must be switched off, depressurized, and emptied.

Maintenance Maintenance work may only be carried out by the manufacturer or authorized specialist companies.

Residual Risks Despite compliance with all safety regulations, residual risks remain from open flames, hot components, and handling flammable fluid.

Liability These instructions are part of the product and must be read in full and observed before installation and operation.

TBF PyroTec GmbH accepts no liability for damage resulting from improper use, incorrect installation, or failure to observe these instructions.

Technical Modifications Technical modifications to the device are not permitted.

Regulations Operation must comply with the applicable national regulations at all times.

TARGET GROUP

These instructions are intended for authorized specialist personnel in the event and show industry for the installation and operation of the Magna Fluvia Flame.

2. INTRODUCTION

The Magna Fluvia Flame (MFF) is a flame projector that produces effect flames with heights of 6 to 20 m and is designed for use in stage and show applications.

The MFF is designed to operate with various liquid fuels. These include, among others: isopropanol, ethanol, IsoparH / J / K, diesel, premium gasoline.

Other fuels may only be used with written approval from TBF-PyroTec.

The fluid is delivered to the burner via an integrated pump. Ignition takes place directly at the burner by means of a high-voltage ignition spark.

Different nozzles are used with correspondingly adjusted device pressure. This ensures a consistent flame design while simultaneously reducing fallout.

The MFF is self-priming and delivers the fluid without an additional pump station over elevation differences of up to 10 m. For greater suction heights, an optional Liquid Booster can be used, which can supply up to four MFF units over elevation differences of up to 50 m.

A 20-liter metal canister serves as the tank. In combination with the corresponding mount, this forms the “The Gallon” system with the following features:

- Truss mounts for installation
- Mechanical locking of the canister
- Integrated drip protection during handling and filling

The device is controlled via:

- DMX
- Art-Net
- sACN

The MFF is integrated into the proTEC safety architecture and can be operated within a monitored emergency-stop chain.

3. proTEC SAFETY ARCHITECTURE

The proTEC safety architecture is a network-based safety system for executing and monitoring emergency-stop and emergency-halt functions in stage technology installations and professional SFX devices.

All components communicate via the proTEC safety protocol and form a unified safety-technical infrastructure.

Third-party devices that are not part of the proTEC family can be integrated into the proTEC safety architecture via SIL-3-safe load disconnection.

FUNCTIONING

The proTEC effect devices — i.e., connected SFX devices such as flame devices and other effect devices — are each assigned to a proTEC Safety Channel (PTSC) from A to H.

The proTEC Control Units can select one or more of these PTSCs and place all devices assigned to the selected PTSCs into either a brief emergency-halt or a SIL-3-compliant emergency-stop state. The Control Units then bring the devices back out of these states in a controlled and defined manner.

BEHAVIOR DURING EMERGENCY-HALT AND EMERGENCY-STOP

In the emergency-halt and emergency-stop state, power and show control signals are redundantly separated:

- In all proTEC effect devices, power and show control signals are redundantly separated.
- In all Control Units, the show control signals are separated.

- In the Stagebox and Power Guard, the power supply is additionally disconnected to SIL-3 standard.

After an emergency-stop state, the proTEC devices must be actively released again via a password-protected reset of the corresponding PTSC, as required by SIL-3. An automatic restart is excluded.

The redundant separation of power and control signal in the proTEC devices already provides a very high level of safety in hazardous situations. However, the SIL-3 safety level is only achieved through the SIL-3-compliant load disconnection of the Stagebox and Power Guard. In this process, the power supply to the proTEC effect devices is additionally routed through the Stagebox or Power Guard and safely disconnected from the mains in the event of an emergency-halt or emergency-stop.

CONTROL, MONITORING AND NETWORK

All devices in the proTEC Safety System process Art-Net, sACN, and DMX.

In addition, the proTEC Control Units can be operated as network nodes, enabling flexible conversion of control signals for integration into existing network and control environments.

At the same time, the controllers continuously visualize the current status of all connected proTEC devices. Via the integrated web server, all proTEC devices can additionally be monitored via a computer.

4. INTENDED USE

The Magna Fluvia Flame is intended for use as a flame projector in stage and show applications.

Use is only permitted with the specified fuels. Operation may only be carried out by trained specialist personnel.

The device may only be used in accordance with these operating instructions. Use must comply with applicable national regulations and required approvals.

Any other use is considered improper.

5. SCOPE OF DELIVERY AND ACCESSORIES

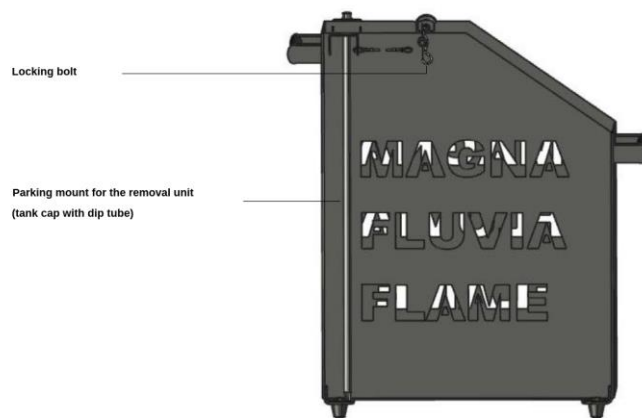
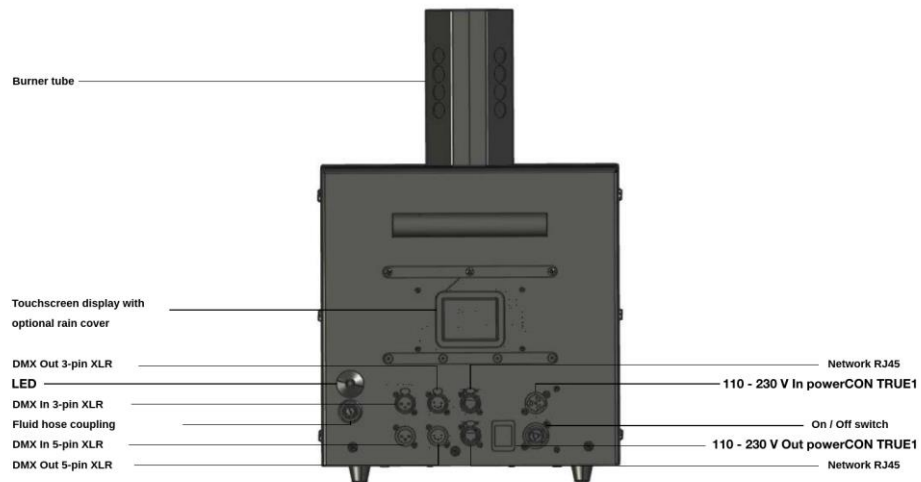
The scope of delivery includes the Magna Fluvia Flame with metal canister and 1.5 m suction hose.

Optional:

- Gallon canister with mount with truss fittings
- Suction hose up to 40 m length
- Liquid Booster for suction heights over 10 m
- proTEC Control Units

6. DEVICE OVERVIEW

6. DEVICE OVERVIEW



7. SWITCHING ON THE DEVICE AND MENU OPERATION

The device can be operated in Prepping Mode without a power supply for configuration, or in mains operation.

As soon as the device is switched on in mains operation, the safety area must be observed.

Before switching on, ensure that no persons, flammable materials, or objects are present in the effective area.

PREPPING MODE (BATTERY OPERATION)

The device can be started in battery operation without connection to the power supply. To do this, press and hold the display for several seconds until the device starts.

The status view is displayed.

Battery operation is used exclusively for configuring the device. Triggering is not possible. The batteries are charged automatically during mains operation.

DISPLAY BEHAVIOR IN BATTERY OPERATION

If no input is made in the status view, the display switches off automatically after 10 seconds.

If no input is made in a menu view, the device automatically returns to the status view after 5 seconds.

OPERATION WITH MAINS CONNECTION

As soon as the device is connected to the power supply, flames can be triggered unintentionally. This can also result from malfunctions or defective control devices.

Before connecting to the mains, ensure that all safety distances are maintained and that no persons or flammable materials are present in the effective area.

The device is connected to the power supply via the power cable.

Switch on the main switch.

The status view is displayed.

DISPLAY BEHAVIOR IN MAINS OPERATION

If no input is made in the status view, the display switches off automatically after the time set in the Settings menu.

The display is activated by tapping; the status view appears.

If no input is made in a menu view, the device automatically returns to the status view after 5 seconds.

DISPLAY STATES

Controls shown on the display are displayed in red when they are active or selected.

Inactive controls are shown in gray.

8. STATUS VIEW

DISPLAY ELEMENTS (TOP OF DISPLAY)

Lock Closed when “Menu Lock” is set with a PIN under the “Info” menu item. If the PIN for “Menu Lock” is forgotten, the Control Unit must be reset to factory settings (Factory Default) by pressing and holding the menu button.

Battery symbol Charge status of the internal battery

Lightning symbol External power supply (110–230 V) active

proTEC Safety Architecture Network Displays the network status of the proTEC safety architecture.

- White = at least one Control Unit is connected, the network is active.
- White with a red cross = no connection to Control Units.
- Red = emergency-halt is active.
- Black = emergency-stop is active.

Temperature display Mainboard temperature

PTSC Displays the assigned proTEC Safety Channel (PTSC). Assignment is done in the Settings menu.

Menu button Short press = open menu. Long press = “Restore factory settings” dialog (Factory Reset).

DISPLAY ELEMENTS (MIDDLE OF DISPLAY)

Fixture ID Unique ID of the controller on the network. Can be assigned under the “DMX – RDM” menu view.

Pressure Displays the pressure present in the device. The device pressure must be within the range defined for the selected nozzle in the Nozzle menu item. If the pressure is outside this range, the value is displayed in red and the device cannot be triggered.

DMX Channel Three-digit display of the set DMX channel of the safety channel. The display lights up continuously when a DMX signal is present. The display flashes when no DMX signal is present.

DISPLAY ELEMENTS (BOTTOM OF DISPLAY)

DMX Displays the DMX status. Green OK when a DMX signal is present. Red cross when no DMX signal is present.

Ethernet Displays the IP address of this Controller Unit on the network

9. MENU VIEW

If no input is made in the menu, the controller automatically jumps back to the status view after 5 seconds.

DMX – RDM Assignment of the DMX channels for the safety channel, fire channel (trigger channel), pump channel, pressure-relief channel, and the Fixture ID.

Network Network settings for this device. IP configuration (DHCP, static, Art-Net, sACN)

Settings LED on/off, display, safety warning, screensaver, PTSC, brightness

Nozzle Setting of the device pressure depending on the nozzle used.

Pressure Settings for device pressure, display and setting of the pressure range, pressure-relief function.

Info Software version, serial number, operating hours, PIN protection, factory default

10. DMX – RDM

Assignment of the DMX channels and Fixture ID

Menu button Back to menu view

Fixture ID Identifier for this Magna Fluvia Flame, freely assignable for identification on the network.

Fire Safety Assignment of a DMX channel to the device's safety channel. The safety channel must not be the same as the pump channel, fire channel, or pressure-relief channel.

Lock When the lock is closed, the pump channel, fire channel, and pressure-relief channel are automatically assigned to the DMX channels following the safety channel. When the lock is open, these channels can be assigned individually, but must not occupy the same channel or the Fire Safety channel.

Pump Assignment of the DMX channel for pump control. The pump channel starts the pump for priming and filling the system as well as for operation during firing. When the lock is open, free channel assignment is possible.

Fire Assignment of the DMX channel to the fire channel (trigger channel). When the lock is open, free assignment is possible.

Depressurize Assignment of the DMX channel for pressure relief. The pressure-relief channel opens the bypass valve and switches off the pump. The device is thereby run depressurized. When the lock is open, free channel assignment is possible.

11. NETWORK VIEW

Network settings of the device.

Configuration of the IP parameters:

- DHCP
- Static IP address
- Art-Net
- sACN

The network configuration must comply with the requirements of the network used. Incorrect settings can lead to connection problems or communication failure. Basic network knowledge is assumed and is not part of these operating instructions.

12. SETTINGS VIEW

Settings for this Magna Fluvia Flame (red is activated).

Menu button Back to menu view.

LED Turns the status LED on and off.

Rotation Normal = display in normal position. Rotated = display rotated 180°. Auto = display is automatically aligned according to the device's positioning.

Safety Warning When this function is activated, the status view lights up red when the safety channel is triggered. When this function is deactivated, there is no change to the status view.

Screensaver Value "0" = off. Values "1–245" = time in seconds until the display switches off.

PTSC Displays the currently selected PTSC. Pressing On allows a PTSC to be selected. Confirm with OK, cancel with Cancel. For operation without proTEC Control Units, the PTSC must be set to Off, otherwise triggering is not possible.

Brightness Regulates the display brightness

13. NOZZLE

Setting of the device pressure depending on the nozzle used.

Menu button Back to menu view.

Nozzle settings Selecting the nozzle size (S, M, or L) adjusts the device pressure settings accordingly.

The device pressure must be within the defined range, meaning:

- Below the upper limit
- Above the lower limit

If the pressure is outside this range, the flame cannot be triggered.

The middle value corresponds to the nozzle code or nozzle size.

Default setting of the device is:

S: 13 bar / code 0006 / 15 bar

M: 13 bar / code 0018 / 15 bar

L: 15 bar / code 0050 / 25 bar

14. PRESSURE

Settings for device pressure (tank pressure).

Menu button Back to menu view.

Pressure display Displays the current device pressure.

Min Pressure and Max Pressure correspond to the limits defined for the selected nozzle in the Nozzle menu item.

The red area on the displayed gauge indicates the pressure range in which the device cannot be operated, regardless of the selected nozzle setting.

Enable – Release Function for relieving the device's pressure after operation by opening the bypass valve.

Activation requires the following steps:

- Press the Enable button
- Then press the Release button
- Both buttons are shown in red when the function is active.

After activation:

- The bypass valve is open
- The pump is switched off
- The device is depressurized

Excess fuel is returned to the canister via the suction hose.

If no hose is connected or the quick coupling is closed, no pressure relief takes place. The fuel remains in the device in this case.

Activation is performed via a two-stage safety function to prevent unintentional opening.

The bypass valve only opens when no DMX signal is present. DMX and network cables must be disconnected before pressure relief.

15. INFO

Device information and further device settings (red is activated).

Menu button Back to menu view

Device name Unique name, also appears in the device list of the proTEC Control Units.

Software version – currently installed version.

Serial number – unique device identifier.

Fixture Hours Total operating hours of the device (cannot be reset)

User Hours Resettable operating hours, e.g., for rental use.

Reset: by tapping the gray field with the User Hours.

PIN: factory setting = 0.

The PIN can be set individually under the “Settings” menu item, User Hour Lock.

Menu Lock Locks access to the menu.

To activate, a four-digit PIN is assigned; the lock symbol on the start screen indicates a locked state.

To deactivate, the current PIN must be entered.

If the PIN is lost, the system can only be unlocked via a Factory Reset.

Factory Reset Restores factory settings.

If the password for menu access is lost, only a Factory Reset can unlock the system.

Alternative: press and hold the menu button on the start screen.

User Hour Lock Function: Protects the User Hour counter from unauthorized resetting.

Factory setting: PIN = 0.

The PIN can be individually set to up to 4 digits.

The User Hours can only be reset by entering the valid PIN.

A Factory Default does not reset the PIN.

16. WEB SERVER

Each proTEC Control Unit can be accessed via its own web server. The computer must be connected according to valid network rules and accessed via a browser.

The following can be accessed and configured on the web server:

Home page Password 2020 must be entered. The menu then appears as on the Control Units.

DMX – RDM Assignment of the DMX channels for the safety channel and the Fixture ID. The channels for pump, fire (trigger channel), and pressure relief are automatically assigned in a fixed order after the safety channel. Individual channel assignment is only possible via the device display. This serves device safety.

Network Network settings for this device. IP configuration (DHCP, static, Art-Net, sACN). Press Apply for changes. Caution: changes to the network may disconnect existing connections, and the computer must be reconnected to the web server accordingly.

Settings LED on/off, display, safety warning, screensaver, PTSC, brightness. Press Apply for changes.

Firmware The “Firmware” menu item is located under “Settings”. This is where the Control Units' firmware is updated. Select file – press Upload and Restart. Abort stops the update. The current software version can be seen under “actual firmware”.

Nozzle Setting of the device pressure depending on the nozzle used. Nozzle settings can only be changed via the device display. Changes via remote access (e.g., web server) are not intended. This serves operational safety. Nozzle setting changes may only be made once the nozzle has been physically changed on the device.

Pressure Reading the device pressure.

Info Shows the device name and software version. Fixture Hours are displayed. User Hours are displayed and can be reset to zero and protected with a PIN.

17. LED AND DISPLAY STATUS INDICATION

The LED and display status indication primarily serves as a local indicator directly on the device.

During normal operation, the states of all connected devices are monitored via the proTEC Control Units or the integrated web server.

In the Settings menu, the LED can be deactivated and the red illumination of the display when the enable channel is active can be switched off.

LED indication

- Orange (continuous) = device pressure below minimum pressure
- Green (flashing) = pressure reached, no DMX signal
- Green (continuous) = pressure reached, DMX signal present
- Red (continuous) = enable channel active, DMX present, pressure reached

Display indication

- Start address flashing: no DMX signal
- Start address lit continuously: DMX signal present
- Display background red: enable channel active

Emergency-Halt / Emergency-Stop (proTEC Safety Units)

- After triggering emergency-halt or emergency-stop: LED flashes orange, start address flashes, display background not red
- After clearing emergency-stop without restart: LED flashes orange, start address lit continuously

18. DEVICE SETUP

INSTALLATION

The device must be installed switched off, with an empty tank and without connected control connections.

Installation can be done standing or hanging.

Suitable truss mounts are available for this purpose.

The device can be installed in any position.

The selected installation position must remain unchanged during operation.

A change of position during operation is not permitted.

The fuel tank (canister) must be placed on a level surface, secured against tipping over, and operated in an upright position with the opening facing up.

The device must be mounted so that it is stable overall and secured against movement, slipping, or twisting.

Flame discharge can occur in any direction.

The hazard area must be kept clear and secured accordingly in all directions.

VISUAL INSPECTION

Before connection, the device must be inspected for visible damage. Damaged devices must not be put into operation.

POWER SUPPLY

As soon as the device is connected to the power supply, flames can be triggered unintentionally. This can also result from malfunctions or defective control devices.

Before connecting to the mains, ensure that all safety distances are maintained and that no persons or flammable materials are present in the effective area.

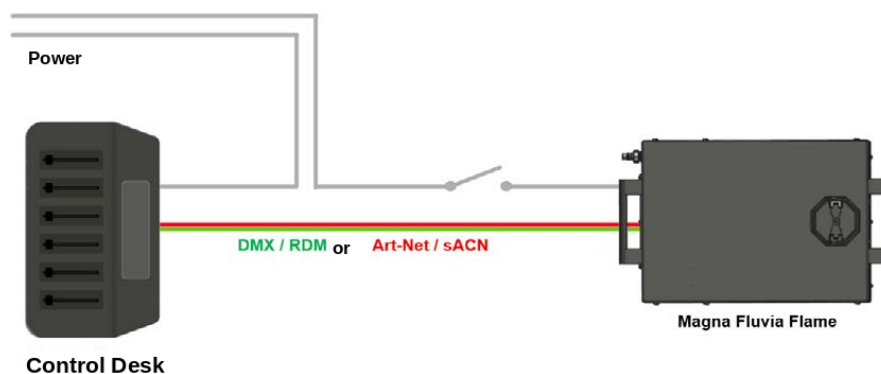
The device is connected to the power supply via a suitable power cable. Supply is at 110–230 V AC. Observe the label on the device.

The power cable must be fully plugged in and secured against accidental disconnection.

SIGNAL AND DATA CONNECTIONS

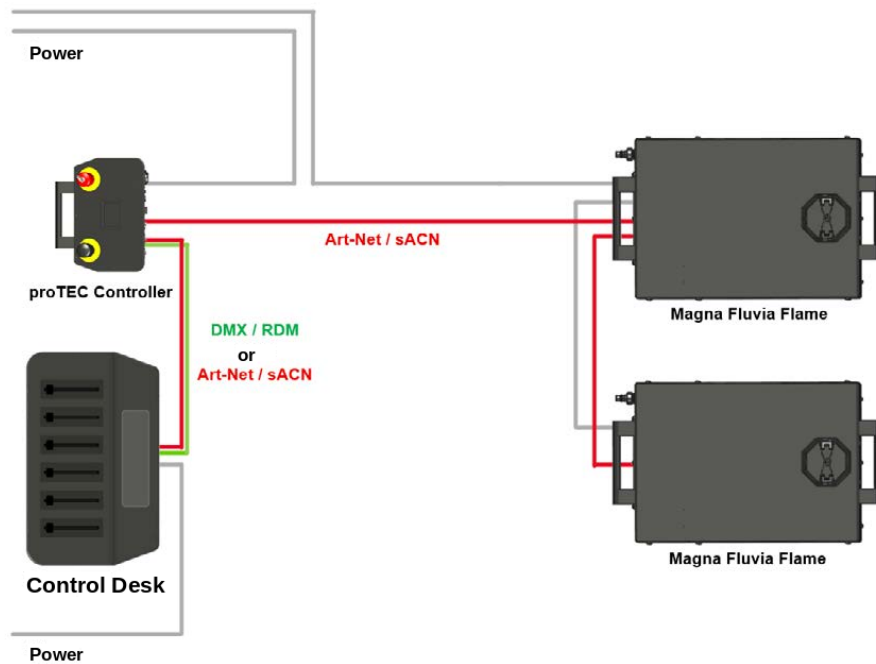
The device can be controlled via DMX / Art-Net / sACN.

Operation without proTEC Control Units In this operating mode, it must be ensured that the device can be disconnected from the power supply at any time.



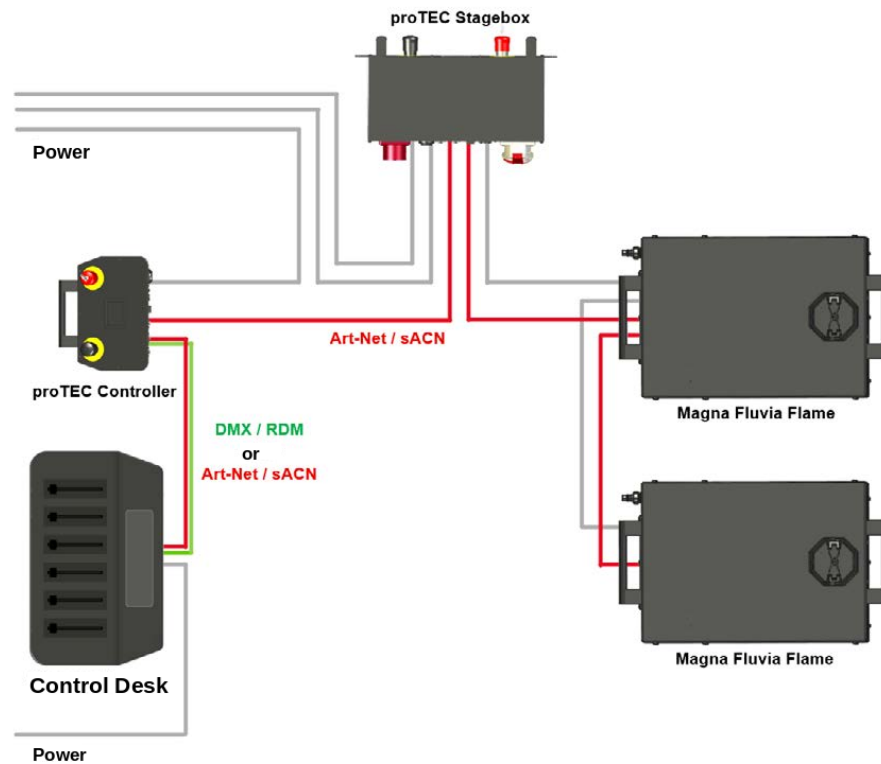
OPERATION WITH THE PROTEC CONTROLLER

In this case, power is disconnected via the Magna Fluvia Flame's proTEC safety system.
This disconnection is not SIL-3-compliant.



OPERATION WITH PROTEC STAGEBOX OR STAGEBOX DILATION

In this case, power is disconnected via a SIL-3-compliant safety disconnection.



19. NOZZLE REPLACEMENT

The device must be switched off before starting work.

To replace the nozzle, remove the housing cover. Then loosen the four screws on the nozzle tube and remove the nozzle tube.

The nozzle is replaced using a 15 mm wrench. The nozzle mount must be held in place with a 17 mm wrench or suitable pliers while doing so.

The nozzle thread is self-sealing and must not be fitted with sealants or gaskets.

When screwing in the nozzle: after the first noticeable resistance, tighten the nozzle by a maximum of a further quarter turn. Do not apply excessive force.

After replacing the nozzle, check the ignition electrodes. The distance from each electrode to the nozzle center / jet axis must be 12–17 mm.

Afterward, reassemble the nozzle tube and housing cover correctly.

Immediately after the mechanical replacement, the corresponding nozzle size must be set in the “Nozzle” menu.

20. FILLING THE TANK

Only approved fuels may be used.

Sparks, open flames, and other ignition sources are prohibited within a radius of at least 5 m.

All safety instructions and safety data sheets (SDS) for the fuel used must be observed.

Conductive tools must be used to prevent electrostatic charging.

Electrostatic charging must be avoided.

The tank must not be overfilled.

If fuel overflows:

- Immediately clean up spilled fluid
- Ventilate the area adequately
- Ensure no ignition sources are present
- Ventilate at ambient temperature

During filling, the tank cap with integrated dip tube must be placed in the mount provided for it. After filling, the tank must be properly closed.

The suction hose must then be connected to the device's quick coupling.

21. CONTROL

The Magna Fluvia Flame (MFF) is controlled via 4 DMX channels. One channel is used as the enable channel (Safety Channel). The following three channels control the pump, fire (trigger channel), and pressure relief (bypass valve) functions in a fixed order.

Enable Channel (Safety Channel)

- DMX value 001–099 and 155–255: deactivated
- DMX value 100–140: activated with pump timeout 2 minutes
- DMX value 141–154: activated with pump timeout 10 minutes

Pump

- DMX value 001–179: deactivated
- DMX value 180–255: activated

Trigger Channel (Fire Channel)

- DMX value 001–179: deactivated
- DMX value 180–255: activated

Pressure Relief (Bypass Valve)

- DMX value 001–179: deactivated
- DMX value 180–255: activated, pump and fire channel deactivated

22. FILLING AND PRESSURE BUILD-UP

To fill the system and build up device pressure, the enable channel must be activated.

The pump begins priming fluid and filling the system. The duration of the pump run is determined by the enable channel:

- 2 minutes for short hose lines
- 10 minutes for long hose lines

If the device does not reach the required pressure within the set time, the pump switches off automatically and error E2 is displayed.

In this case, switch off the device and check the cause. Possible causes:

- Suction line too long
- Canister empty
- Pump defective
- Fuel circuit leaking

Defective devices must be taken out of service and repaired.

After resolving the cause (e.g., filling the tank), switch the device on again and repeat the filling process as described.

For long suction lines, it may be necessary to start the pumping process several times until the fluid reaches the burner and the required device pressure is built up.

The LED indicates the status of the device pressure.

If it lights up orange, the required pressure has not been reached; if it lights up green, the pressure is within the permitted range.

23. TRIGGERING

To trigger the flame, activate the enable channel and then actuate the trigger channel.

The device produces flames as long as the device pressure is within the range defined for the selected nozzle.

If the device pressure falls below this range, the trigger channel is blocked until the required pressure is reached again.

24. DECOMMISSIONING

To decommission the device, activate the enable channel and the pressure-relief channel. The excess fluid is returned to the tank until the device is depressurized.

Then deactivate the DMX channels and switch off the device.

Disconnect the tank, suction hose, and device from each other. Disconnect all cable connections.

The device can then be transported. The tank may be transported filled.

25. TECHNICAL DATA

Dimensions (L×W×H) 334 x 550 x 518 mm / 13.15 x 21.65 x 20.39 in

Weight 38 kg / 83.78 lbs

Voltage 100–240 VAC / 50–60 Hz

Power consumption 1000 W

Temperature 5°C – 45°C / 41°F – 113°F

Control DMX, RDM, Art-Net, sACN

Required DMX channels 4: enable channel, pump, trigger, pressure relief

Fluid Isopropanol; Ethanol, IsoparH / J / K; Diesel; Premium gasoline

Tank 20 liters / 700 fl. oz.

Device pressure 6 bar < x < 25 bar / 90 psi < x < 375 psi