

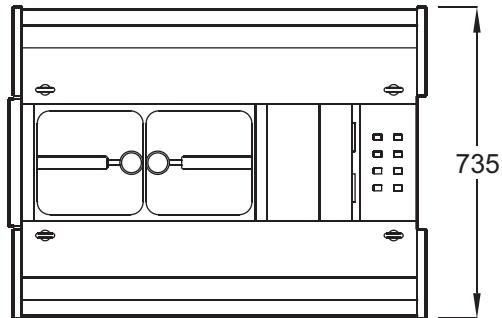
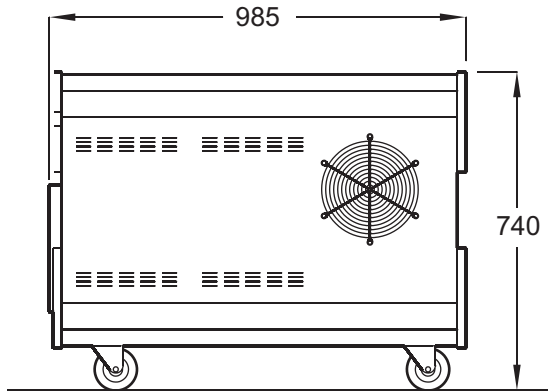


USER MANUAL

TRAINER X-STREAM

Dimensions

All dimensions are in millimeters



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P/N 35000182D

Safety information

The following symbols are used to identify important safety information:



Danger! Safety hazard. Risk of personal injury.



Danger! Hazardous voltage. Contact will cause electric shock.



Caution! Fire hazard.



Caution! Burn hazard. Hot surface. Do not touch.



Danger! This product is not for household use.

Read this manual before operating the machine, follow the safety precautions listed below, and observe all warnings in this manual and printed on the machine. Use the machine only as described in this manual and in accordance with local laws and regulations.

If you have questions about how to operate the machine safely, or if you have followed the instructions in this manual and the machine is malfunctioning, please contact MSS Professional on (+44) 1604 839 000 or (+45) 87 400 000.



Preventing electric shocks

- Always ground (earth) the machine electrically.
- The machine may only be connected to AC power using 3-conductor cable that is rated 32 Amp, extra hard usage, oil-resistant jacket, outdoors applications. Suitable cable types include SEO and STO.
- Use only a source of AC power that complies with local building and electrical codes, and that has both overload and ground-fault protection.
- Before connecting the Trainer X-Stream to power, check that the voltage range indicated on the machine's serial label matches your local AC power voltage. If your AC power voltage is outside the range indicated, do not use the machine. Contact MSS Professional for assistance.
- Before using the machine, check that all power distribution equipment and cables are in perfect condition and rated for the current requirements of all connected devices.
- If the machine or any cables connected to it are in any way damaged, defective, or show signs of overheating, stop using the machine and contact MSS Professional for assistance.

- Disconnect the machine from AC power before refilling or changing the fluid container, before servicing, and when not in use.
- This machine is water-resistant but not totally waterproof. Do not immerse in water or any other liquid. Do not expose to high-pressure water jets.
- Do not spill fluid over the machine. If fluid is spilled, clean the machine with a damp cloth. If fluid is spilled onto electronic parts, contact MSS Professional for advice.
- Do not remove the covers or attempt to repair a faulty machine. Refer any service not described in this manual to MSS Professional.
- Do not operate the machine if any parts are damaged, defective or missing.



Preventing burns and fire

- The smoke produced by the machine is hot enough to cause burns when it leaves the nozzle, and very hot droplets of fluid escape occasionally. Keep people and objects at least 1 meter (39 inches) away from the smoke output nozzle area.
- Do not touch the smoke output nozzles during or after use – they become extremely hot and remain hot for up to 10 hours after the machine has been used.
- Do not attempt to bypass thermostatic switches, fluid sensors or fuses.
- Replace fuses only with ones of the type and rating specified in this manual for the machine.
- Provide a minimum free space of 10 cm (4 inches) around the machine.
- Provide a minimum free space of 50 cm (20 inches) around fans and air vents and ensure free and unobstructed air flow to and around the machine.
- Keep the machine at least 60 cm (24 inches) away from combustible and heat-sensitive materials.
- Do not operate the machine if the ambient temperature (T_a) is below 5° C (41° F) or above 40° C (104° F).
- Do not operate the machine if the relative air humidity exceeds 80%.
- Do not recycle dense smoke into the machine.



Preventing injuries

- Lift or suspend the machine only using the four eyebolts located on the top of the machine. All four eyebolts must be used.
- Ensure that any lifting gear or suspension system used and the surface on which the machine is installed can safely hold the weight of the machine.
- Suspending the machine directly over people's heads is not recommended. Use smoke ducting instead.

- Lock the castors when not moving the machine. Secure the machine with an adequately dimensioned and approved safety attachment if there is any possibility that it may be a hazard.
- Do not point smoke output directly at a person's face or at face height.
- Smoke machines can cause condensation. If smoke concentration is high for extended periods, floors and surfaces may become slippery. Wipe dry as necessary to avoid any danger of slipping.
- Smoke fluid contains food-grade glycols in solution but may present health risks if swallowed. Do not drink it. Store it securely. If eye contact occurs, rinse with water. If fluid is swallowed, give water and obtain medical advice.



Preventing breathing problems

- A smoke machine can operate safely only with the exact type of smoke fluid it was designed for. Use the machine only with MSS Professional Trainer Fluid or you may cause the release of toxic gases, presenting a severe health hazard. You will also probably damage the machine.



Disposing of this product

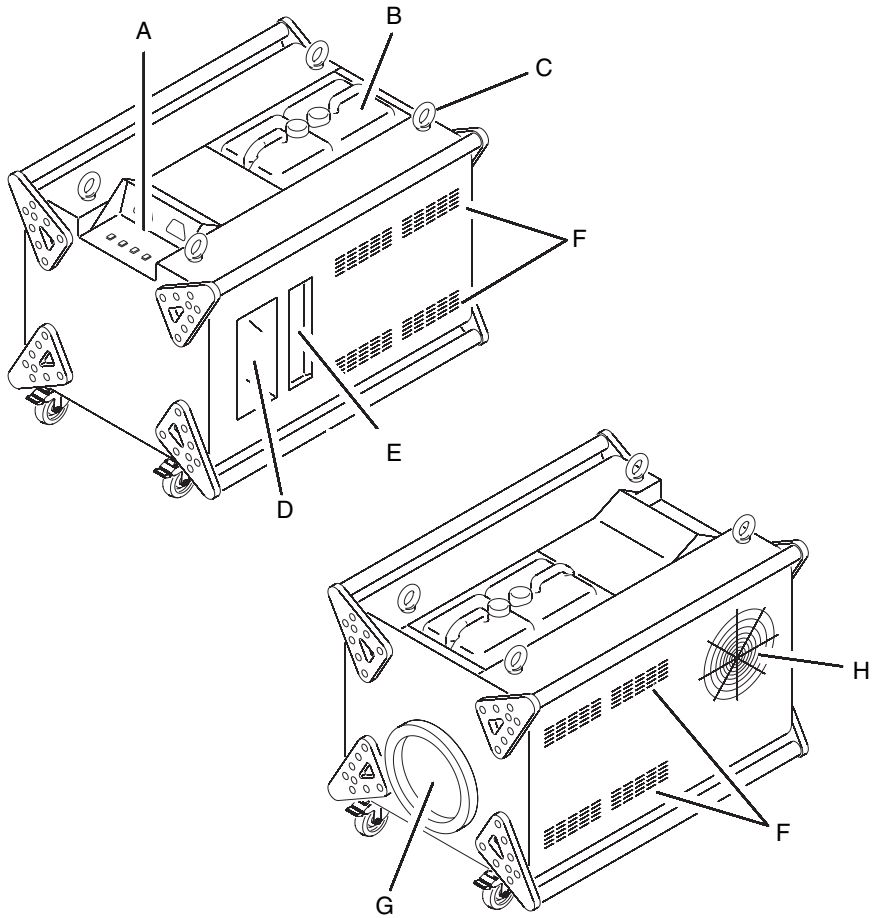
MSS Professional products are supplied in compliance with Directive 2002/96/EC of the European Parliament and of the Council of the European Union on WEEE (Waste Electrical and Electronic Equipment), as amended by Directive 2003/108/EC, where applicable.

Help preserve the environment! Ensure that this product is recycled at the end of its life. Your supplier can give details of local arrangements for the disposal of MSS Professional products.

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Product overview



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- A Control panel**
 - B Fluid containers**
 - C Suspension eyebolts**
 - D Power inlet & circuit breaker**

- E Remote control input**
 - F Air vents**
 - G Smoke output chamber**
 - H Fan inlet**
-

Introduction

The Trainer X-Stream is a versatile, rugged, high-capacity smoke machine for use in fire and evacuation training exercises. Using the X-Stream Airflow System, it fires smoke from two heat exchangers into the airstream of a powerful fan to generate up to 5000 cubic meters of smoke per minute.

Independent control of the smoke output and fan allow for realistic simulation of conditions varying from light haze to extremely dense smoke, which can be maintained for extended periods without an operator using the built-in timer.

The fluid compartment holds two 9.5 liter containers of safe and economical water-based MSS Professional Trainer Fluid. Two grades are available: medium and heavy. No messy refill is required: simply drop in fresh containers and screw on the caps. The machine shuts off the pump automatically when it runs out of smoke fluid.

The Trainer X-Stream is designed to cope with the rigors of training with heavy-duty lockable castors, a rigid chassis protected on all 8 corners by aluminum plates and 40 mm lifting bars. The sturdy aluminum ring at the smoke chamber opening receives 300 mm flexible ducting. The outer casing and control panel are water-resistant.

Details of the full range of MSS Professional training products are available on our website at www.training-smoke.com.

Features

The Trainer X-Stream features:

- Dual, overheat-protected 2.5 kW heat exchangers
- Independent smoke density and fan control
- Timer for continuous, unattended operation
- Electronic low fluid detection, warning, and cutoff
- 19 liters (5 US gallons / 4.16 Imperial gallons) on-board fluid capacity
- Electronic pump ramping system for non-stop operation
- Heavy-duty construction
- Water-resistant housing
- Optional remote control

Installation



DANGER! DO NOT try to install the Trainer X-Stream until you have read and observed all the precautions listed in “*Safety information*” on page 3.

Unpacking

Unpack the machine and check for signs of damage.

The Trainer X-Stream is supplied with:

- User manual
- Power input cable connector

Machine location

The Trainer X-Stream must be placed on a level, stable surface that can safely support its weight. Lock the castors as soon as the machine is correctly located and whenever leaving the machine unattended.

Installing the machine directly over people’s heads is not recommended. If smoke output above ground level is required, the easiest solution is to use flexible smoke ducting. If, however, the machine is to be hoisted, check that lifting gear and any suspension system used can bear the weight of the machine and fasten rigging to all four suspension eyebolts.

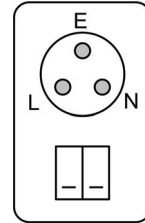
Extended exposure to smoke may cause problems with electronic devices. If an exercise involves very dense smoke, locate the machine itself in a smoke-free location and use ducting to transport the smoke into the training area.

The machine requires space on all sides for cooling and ventilation. Ensure that there is a minimum free space of 10 cm (4 inches) around the machine, minimum 50 cm (20 inches) unobstructed airflow around the air vents, minimum 60 cm (24 inches) distance to combustible and heat-sensitive materials, and minimum 1 m (40 inches) free space in front of the smoke output chamber.

AC power

Voltage requirements

The Trainer X-Stream requires 200 - 250 VAC, 50/60 Hz AC power. If your AC power voltage is outside this range, do not use the machine.



Inlet type and wiring

The power inlet is a C-Form 3-pin (single phase) 240 V, 32 A male connector. The 25 A circuit breaker is located below the inlet.

A corresponding C-Form 32 Amp female power cable connector is supplied with the Trainer X-Stream. The figure shows the live (L), neutral (N), and ground/earth (E) pins. The live pin is marked "L" on the female power cable connector.

The Trainer X-Stream can be connected to 120/208 V three-phase AC power by connecting phase 1 to the live conductor and phase 2 to the neutral conductor to obtain 208 VAC. The ground conductor must be connected to ground (earth).

Power cable and plug



The supplied female power cable connector must be installed on a 32 Amp, 3-conductor power cable that is rated extra hard usage, oil-resistant jacket, outdoors applications (SEO or STO rated, for example). Do not use any type of power cable that does not meet or exceed this rating, or you may put lives at risk!

The power cable must be fitted with a grounding-type (earthed) 32 A power plug that fits your AC power outlet. Follow the power plug manufacturer's instructions when installing the plug. The table below shows some common pin identification schemes.

Wire	Pin	Marking	Screw color
brown	live	"L"	yellow or brass
blue	neutral	"N"	silver
yellow/green	ground (earth)		green

Ducting

The aluminum ring at the smoke output chamber receives standard 300 mm (12-inch) flexible ducting. The Trainer X-Stream's fan can blow smoke through a 10 meter (33 foot) length of ducting without difficulty.

If a significantly longer duct is required, please contact MSS Professional.

Remote control

An optional remote control is available separately that allows the Trainer X-Stream to be fired remotely at the smoke and fan levels set on the control panel.

The remote control is supplied with a 5 m (16.4 ft) cable and connects to the Trainer X-Stream through the 3-pin XLR connector on the connections panel.

A longer cable can be fitted to allow a maximum cable length of 25 m (82 ft). Readily-available three-conductor microphone cable can be used for this purpose.

The pin configuration of the XLR connectors is:

Pin 1: Ground

Pin 2: 2-12 Volt output

Pin 3: Input

Smoke fluid



DANGER! A smoke machine can run safely only on the specific smoke fluids it is designed for. Use **ONLY MSS Professional Trainer Fluid** in the Trainer X-Stream. **NEVER** operate the machine with any other type of fluid, or toxic gas may be produced. You will probably also cause damage to the machine that is not covered by the product warranty. Do not dilute smoke fluid with water or any other liquid. Discard smoke fluid if it becomes contaminated.

Compatible smoke fluids

Two grades of MSS Professional Trainer Fluid for use in the Trainer X-Stream are available from your MSS Professional dealer. The choice of fluid affects the density and persistence of the smoke.

- Medium gives a medium-density smoke that is suitable for small and medium-sized areas.
- Heavy gives a high-density smoke with high persistence that performs better in large, open areas.

These are the only fluids that are suitable for use in the Trainer X-Stream.

Capacity and packaging

The fluid compartment accepts two 9.5 liter (2.5 US gallon / 2.1 Imperial gallon) containers of MSS Professional Trainer Fluid.

MSS Professional Trainer Fluid is also available in 25 liter (6.6 US gallon / 5.5 Imperial gallon) containers.

Two full containers provide approximately 4.5 hours of continuous operation. Electronic fluid sensors monitor the fluid level in each container and shut down the pump when the fluid level is low. If this occurs, **F L U** appears in the left-hand display.

Filling the machine

Important! Keep smoke fluid and all components in the fluid system free of dust, dirt, fluff and any form of contamination.

Do not shake or vibrate the fluid container or machine, as this will create air bubbles in the fluid. Excessive bubbles impair performance and may cause damage to the heat exchangers that is not covered by the product warranty.

Fill or refill the fluid system as follows.

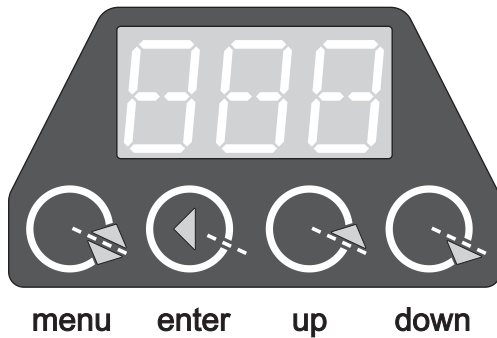
1. Isolate the Trainer X-Stream from power.
2. Remove the fluid adaptor caps together with fluid lines from the empty fluid containers and remove the containers from the fluid compartment.
3. Check that fluid containers, adaptor cap, lines and filter are totally free of dirt, fluff and other small particles. Impurities may clog the machine and make service or repair necessary.
4. Place two full containers of MSS Professional Trainer Fluid into the fluid compartment and remove their caps.
5. Screw the fluid adaptor caps firmly onto each container, ensuring that the suction tube with fluid filter reaches the bottom.

Control panel

The machine is operated from the control panel, which has two LED displays and four toggle switches.

Menu navigation

Located below each display are four keys with the functions described below. Approximately 15 seconds after the last keystroke, the display reverts to displaying status information.



Menu key

Press the menu key to enter edit mode and display the control menu. Press repeatedly to scroll through the menus.

Note: The **RL E** menu (in the right display) has no function.

Enter key

Press the enter key to view the current value for a setting or to store a new value after changing a setting with the up and down keys. If the enter key is not pressed, the current setting remains active but is lost when the machine is turned off.

Up/Down keys

Press the up and down keys to increase or decrease setting values.

Status messages

Under normal operation, the displays provide status information. The displays can alternate between two messages, e.g. 'Fog' and '16'.

Left display

The following messages can appear in the left display.

Message	Occurs when...
<i>Fo9 OFF</i>	The standby switch is set to OFF. The machine can not be fired and the heaters are off.
<i>Fo9 Err</i>	The Standby switch is ON but the heater is not working. This is an error condition and should not normally occur.
<i>Fo9 Ht</i>	The smoke machine is heating up. Allow approximately 18 minutes for the machine to reach operating temperature.
<i>Fo9 rdy</i>	The machine is ready to generate smoke.
<i>Fo9 08</i>	The FOG switch is pressed. The number displayed is the current smoke output level.
<i>FLU Lo</i>	The fluid level is too low to operate the machine. Only visible when the machine has reached its ready state.
<i>tOn 04 - toF 03</i>	The timer is running. The number displayed is the elapsed run or wait time in seconds.

Right display

The following messages can appear in the right display.

Message	Occurs when...
<i>FAn OFF</i>	The standby switch is set to OFF. The machine can not be fired and the heaters are off.
<i>FAn 20</i>	The FAN switch is pressed. The number displayed is the current fan speed level.

User settings

Smoke density

The density of the smoke output can be adjusted in 21 steps from 0 (off) to 20 (maximum density). Set smoke density as follows:

1. Under the left display, press **menu** as required to display **F₀₉**.
2. Press **enter** to view the current value.
3. Use the **up** and **down** keys to increase or decrease the value.
4. Press **enter** to save the setting.

Fan speed

The fan speed can be adjusted in 21 steps from 0 (off) to 20 (full speed). Set the fan speed as follows:

1. Under the right display, press **menu** as required to display **FAN**.
2. Press **enter** to view the current value.
3. Use the **up** and **down** keys to increase or decrease the value.
4. Press **enter** to save the setting.

Firing and wait intervals

Timer operation is controlled by the firing (time on) and wait (time off) settings. Set the intervals as follows:

1. Under the left display, press **menu** as required to display **t_{on}**.
2. Use the **up** and **down** keys to select a firing time from 0 to 90 seconds.
3. Press **enter** to save the firing interval setting.
4. Press **menu** once to display **t_{off}**.
5. Use the **up** and **down** keys to select a wait time from 0 to 90 seconds.
6. Press **enter** to save the wait interval setting.

Supply voltage

The supply voltage setting optimizes pump performance for the local AC power voltage, from 200 to 250 VAC. Check and adjust this setting when using the machine for the first time and whenever operating in a location with a different AC voltage. Adjust the supply voltage setting as follows:

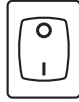
1. Under the right display, press **menu** as required to display **SUP**.
2. Press **enter** to view the current value.
3. Use the **up** and **down** keys to increase or decrease the value to match the local AC supply voltage.
4. Press **enter** to save the setting.

Control switches

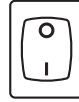
The switches control the machine's pump, heater, timer, and fan. They can be used individually or in combination. "I" represents the on position.



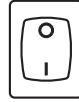
FOG



STANDBY



TIMER



FAN

Fog

The FOG switch runs the fluid pumps and fan to generate smoke with the user-selected smoke density and fan speed levels.

Standby

The STANDBY switch turns on the heaters, which require approximately 18 minutes to reach operating temperature when cold. When off, there is no power to the heaters and smoke cannot be generated.

Timer

The TIMER switch toggles timer operation on and off.

When the timer is switched on, smoke is generated with user-selected smoke density and fan speed levels in a repeating cycle with user-selected firing and wait intervals.

Extra smoke can be generated during the wait interval by pressing the FOG switch.

Switching the timer off will halt the operation at any time during the cycle.

Fan

The FAN switch runs the fan at the selected fan speed level without generating smoke.

General operation

Pre-operation checks



DANGER! DO NOT try to operate the Trainer X-Stream until you have read and observed all the precautions listed in “*Safety information*” on page 3 and read “*Installation*” on page 9. Before operating, check that:

- the fluid containers are filled with enough fluid,
- the Trainer X-Stream is correctly and safely installed.

Starting the Trainer X-Stream

To start the Trainer X-Stream from a ‘cold’ state:

1. Set the four control switches to the O (off) position.
2. Set the power inlet circuit breaker to the I (on) position and connect the power cable.
3. Set the Standby switch to the I (on) position. The left display should show **FOG Ht**.
4. Allow approximately 18 minutes for the machine to reach operating temperature.
5. The machine is ready when **rdy** appears in the left display. If you are starting the machine after an extended period of storage or after changing the fluid containers, prime the pumps by setting the smoke density level to 20 and pressing the FOG button for a few seconds until a steady stream of smoke is produced.

Generating smoke

The simplest way to generate smoke is to press the FOG switch to the I (on) position. The density of the resulting smoke will depend on firing time, setting levels, fluid weight, room size, and ventilation.

Adjust the user settings (page 16) to obtain the desired smoke density and an even distribution. For thicker smoke, increase the smoke density setting, decrease fan speed, and/or increase firing time. For thinner smoke, use a lower smoke density setting, increase fan speed, and/or decrease firing time. Contact MSS Professional for advice if you have difficulty achieving satisfactory results.

The timer function may be used for continuous, unattended operation. Several minutes of manual operation will give you a feel for the firing and wait intervals to use to achieve the desired effect.

The Trainer X-Stream uses a technique called 'pump ramping' to provide continuous smoke output. While the heat exchanger has sufficient energy, the machine outputs smoke at the set rate. As the heater cools, however, the pump ramping system reduces the pump speed to maintain continuous output at a lower rate.

To prevent damage to the machine, the fluid pumps are automatically disabled when sensors detect that there is no more fluid.

Basic service



Any service not described in this section must be carried out by a service technician authorized by MSS Professional. Please refer to MSS Professional for assistance with obtaining service.

Before servicing the Trainer X-Stream, read and observe all the precautions listed in “*Safety information*” on page 3.

Cleaning

Casing

Excessive dust, smoke fluid, and dirt buildup will degrade performance and cause overheating and damage to the machine that is not covered by the product warranty. To maintain adequate cooling, dust must be cleaned from the outer casing and air vents periodically.



Isolate the machine from power and allow to cool completely before cleaning. Use extreme caution when cleaning inside the smoke output chamber; the smoke output nozzles remain hot for up to 10 hours after use.

- Remove dust from the air vents on the side of the outer casing with a soft brush, cotton swab, vacuum, or compressed air.
- Clean the outer casing with a damp cloth only.
- Ensure that the nozzles are completely cool, then wipe up any smoke fluid residue from the smoke output chamber with a damp cloth.

Fluid filter

The Trainer X-Stream uses washable filters on the ends of the smoke fluid suction tubes. Check that the filters are perfectly clean each time you change or refill the smoke fluid containers.

If a filter is dirty or contaminated, wash in clean water until perfectly clean. Replacement filters may be obtained from MSS Professional.

Troubleshooting

Problem	Probable cause(s)	Suggested remedy
No smoke output when the machine is fired	Machine is not ready	Verify that STANDBY switch is on and allow time to heat
	Fluid is exhausted	Add fluid
	Smoke density set to 0	Set F09 value of 1 to 20
Machine appears dead	Circuit breakers tripped	Reset circuit breakers
	No power at AC cable inlet	Check power cable and circuit breaker
	Machine requires service	Refer to MSS Professional
Machine is not ready after 20 minutes heating time	Standby switch is OFF	Set Standby to ON
	Insufficient AC power cable	Replace with 32 A cable
	Machine requires service	Refer to MSS Professional
Smoke disperses too quickly	Wrong grade of fluid used for the application	Use Heavy Training Fluid
	Smoke density level too low	Increase density setting
Wet, greasy, non-uniform smoke output, or fluid drips or spits from nozzles	Wrong smoke fluid	Replace with approved fluid
	Contaminated smoke fluid	Replace fluid
	Clogged or dirty fluid filter	Clean fluid filter
	Incorrect AC supply setting	Check and adjust setting
	Machine requires service	Refer to MSS Professional
Circuit breaker trips repeatedly	Defective power cable	Replace power cable
	Electrical malfunction	Refer to MSS Professional

Specifications

Performance

Maximum smoke output 5 000 cubic meters (176 000 cubic ft.) per minute
Operation time continuous
Warm-up time 18 minutes

Control and programming

Control interface dual LED push button displays, 4 toggle switches
Smoke density control 0 - 100% in 21 steps
Fan speed control 0 - 100% in 21 steps
Timer firing interval 0 - 90 seconds in 1 second increments
Timer wait interval 0 - 90 seconds in 1 second increments
Remote control output trigger via accessory cable remote control

Heat exchanger

Heaters Two 2.5 kW (at 240 V)
Thermal protection Direct ceramic thermal trip device
Temperature control Electronic (thermocouple)

Fluid system

Approved fluid MSS Professional Trainer Fluid, Medium or Heavy
Fluid capacity 19 liters (5 US gallons / 4.16 Imperial gallons)
Maximum fluid consumption 650 ml per minute
Maximum operating time at full output Approx. 4.5 hours
Fluid pump Oscillating piston high pressure
Low fluid detection Electronic sensor

Electrical

AC power 200 - 250 VAC, 50/60 Hz
Maximum current 25 A
Maximum power 5.5 kW @ 230 V
Fuses 2 x 12 AT, 1 x 5 AT

Connections

Power inlet C-Form 32 Amp grounding type (earthed)
Remote control connection 3-pin XLR
Ducting Accepts 300mm (12 inch) flexible ducting

Installation

Minimum clearance in front of output nozzle	1 m (40 inches)
Minimum free space around air vents	50 cm (20 inches)
Minimum free space around machine	10 cm (4 inches)
Minimum distance to combustible materials	60 cm (24 inches)
Minimum ambient temperature	5° C (41° F)
Maximum ambient temperature	40° C (104° F)
Maximum relative humidity	80%

Physical

Dimensions (L x W x H)	985 x 735 x 740 mm (38.8 x 28.9 x 29.1 in.)
Shipping size (L x W x H)	1200 x 800 x 950 mm (47.3 x 31.5 x 37.4 in.)
Weight (without fluid)	167 kg (367 lb.)
Weight (with fluid)	186 kg (410 lb.)

Approvals

This product meets the requirements of the following EC Standards, and as such complies with the EMC and LVD directives of the European Community:



European EMC: EN 50 081-1, EN 55 014,
EN 55 022 /B, EN 60 555
European safety: EN 60 335-1
Immunity: EN 50 082-1, IEC 801-2, IEC 801-4

Included Items

C-Form cable connector for installation on power cable
User manual

Accessories

9.5 liter container, MSS Professional Trainer Fluid Medium	P/N 97121224
9.5 liter container, MSS Professional Trainer Fluid Heavy	P/N 97121227
25 liter container, MSS Professional Trainer Fluid Medium	P/N 97121225
25 liter container, MSS Professional Trainer Fluid Heavy	P/N 97121228
Trainer X-Stream remote control unit	P/N 92765025

Ordering information

Trainer X-stream, 230 V, 50/60 Hz	P/N 92256300
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Specifications subject to change without notice.

Supplier

Primetime AB
Agavägen 15
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