JEM ZR44 HI-MASS™

user manual

Martin

Dimensions

All dimensions are in millimeters

379

353

248

687

Contents

Safety information

The following symbols are used to identify important safety information:


| Caution! Safety hazard. Risk of personal injury. | Caution! Burn hazard. Hot surface. Do not touch. | Danger! Hazardous voltage. Contact will cause electric shock. | Caution! Fire hazard. |

Warning! This product is not for household use. It presents risks of injury due to electric shock, burns, falls and respiratory problems!

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 system 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 Martin Service.

Preventing electric shocks

- Always ground (earth) the machine electrically.
- 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 smoke machine to power, check that the voltage indicated on the machine's serial label matches your local AC power voltage. If your AC power voltage does not match, do not use the machine. Contact Martin Service 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, wet, or show signs of overheating, stop using the machine and contact Martin Service for assistance. If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.
- Disconnect the machine from AC power before servicing and when not in use.
- This system is not waterproof and should not be exposed to wet outdoor conditions. Do not immerse in water or any other liquid. Do not expose to high-pressure water jets.
- Do not spill fluid over or inside the machine. If fluid is spilled, disconnect AC power and clean with a damp cloth. If fluid is spilled onto electronic parts, take the system out of service and contact Martin for advice.

- Do not remove the covers or attempt to repair a faulty machine. Refer any service not described in this manual to Martin.
- Do not operate the machine if any parts are damaged, defective or missing.
- Moisture and electricity do not mix. Do not aim smoke output at electrical connections or devices.

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.
- Do not touch the smoke output nozzle during or after use – it becomes extremely hot and remains hot for several hours after the machine has been shut down.
- Smoke output contains glycol, a flammable alcohol that burns with an almost invisible blue flame. Do not point smoke output at sources of ignition such as open flames or pyrotechnic effects.
- 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 100mm (4 inches) around the machine.
- Provide a minimum free space of 500mm (20 inches) around fans and air vents and ensure free and unobstructed air flow to and around the machine.
- Keep the machine at least 600mm (24 inches) away from combustible and heat-sensitive materials.
- Do not operate the machine if the ambient temperature (Ta) is below 5° C (41° F) or above 40° C (104° F).
- Do not operate the machine if the relative air humidity exceeds 80%.

Preventing injuries

- Ensure that the surface on which the machine is located or installed can safely hold the weight of the machine.
- Do not install the machine over areas where people are present.
- This appliance is not intended for use by persons (including children) with reduced physical sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
- Smoke machines can cause condensation. Do not point the output at smooth floors. Floors and surfaces may become slippery. Check these frequently and wipe dry as necessary to avoid any danger of slipping.
- Ensure at least 2m visibility in areas where smoke is being produced.
- 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 smoke fluid it is designed for. Use the machine only with fluids specified under "Smoke fluid options" on page 13 or you may cause the release of toxic gases, presenting a severe health hazard. You will also probably damage the machine.

- Do not create dense smoke in confined or poorly ventilated areas.

- Do not expose people with health problems (including allergic and/or respiratory conditions such as asthma) to smoke output.

- Do not point smoke output directly at a person's face or at face height.

Product overview

The Jem ZR44 Hi-Mass™ is a reliable and highly efficient fogger capable of precise fog delivery from subtle to massive. Ideal for a variety of settings from small venues to huge stadiums and arenas, it features advanced technology for top-quality performance, as well as advances in digital functionality such as RDM compatibility.

Following on from its predecessor the industry standard ZR33 the new Jem ZR44 Hi-Mass™ encompasses what Martin smoke machines are all about: state of the art technology, high quality and ruggedness.

Congratulations on your purchase of this smoke machine from Martin. Details of the full range of Martin products are available on our website at www.martin.com.

Features at a glance

- Tough and solid design
- On board remote control
- 1200 m³/min fog output
- Digital link machine to machine (Using optional Digital Multi-Function remote)
- Continuous operation (at reduced output)
- Indirect fluid sensing
- 3 & 5 pin DMX interface
- RDM capable
- Soft Start technology
- Timer / output level remote
- Fast heating/reheat times
- Proprietary Pro Steam Simulation fluid solution
- Different fluid options for different applications
- Leaves no oil residue on light fixtures
- 9.5L fluid capacity
- Flying bracket as standard
- Neutrik PowerCon connector
- DTP direct thermal fault protection device

Product details

Remove remote control to access
Digital remote (accessory) socket.

Remote control

Main power
switch

Power inlet
connector

Dip switch
(DMX address)

5 pin DMX
input and
link

AVR program
upload socket

3 pin DMX
input and
link

Fluid tank

Flying
bracket

Fog output
nozzle
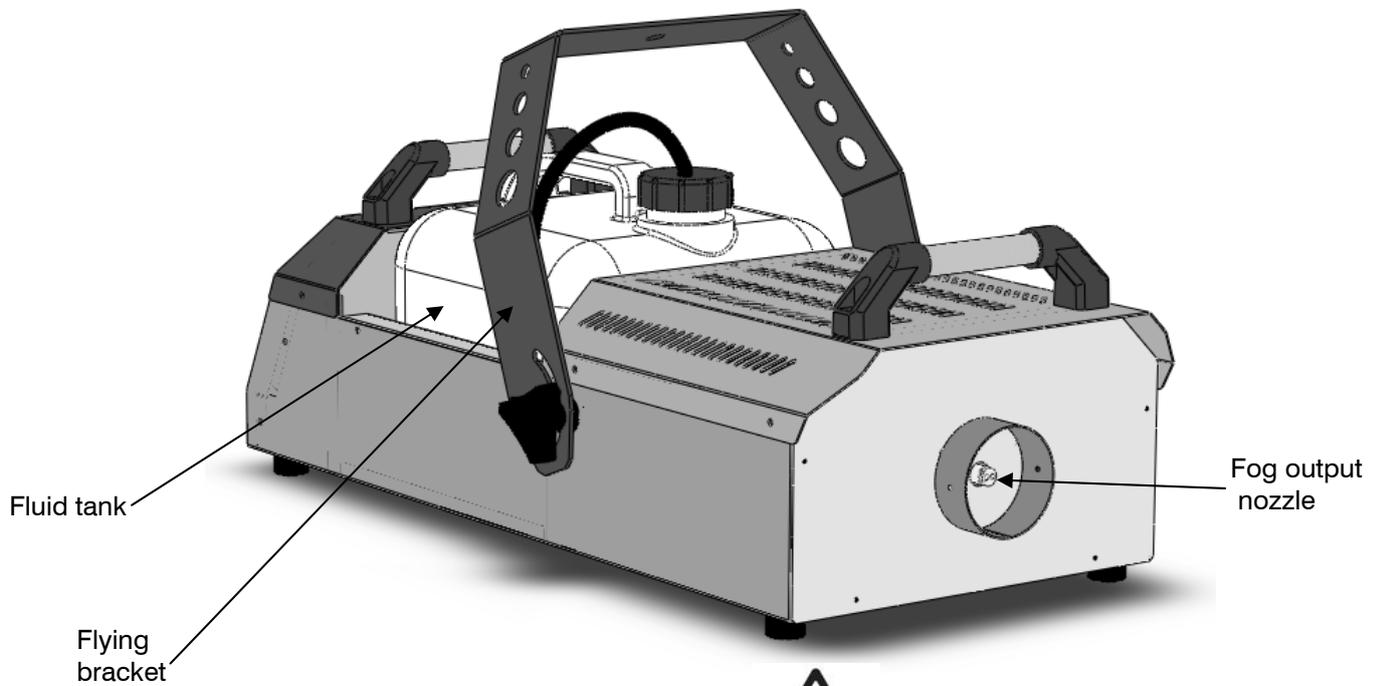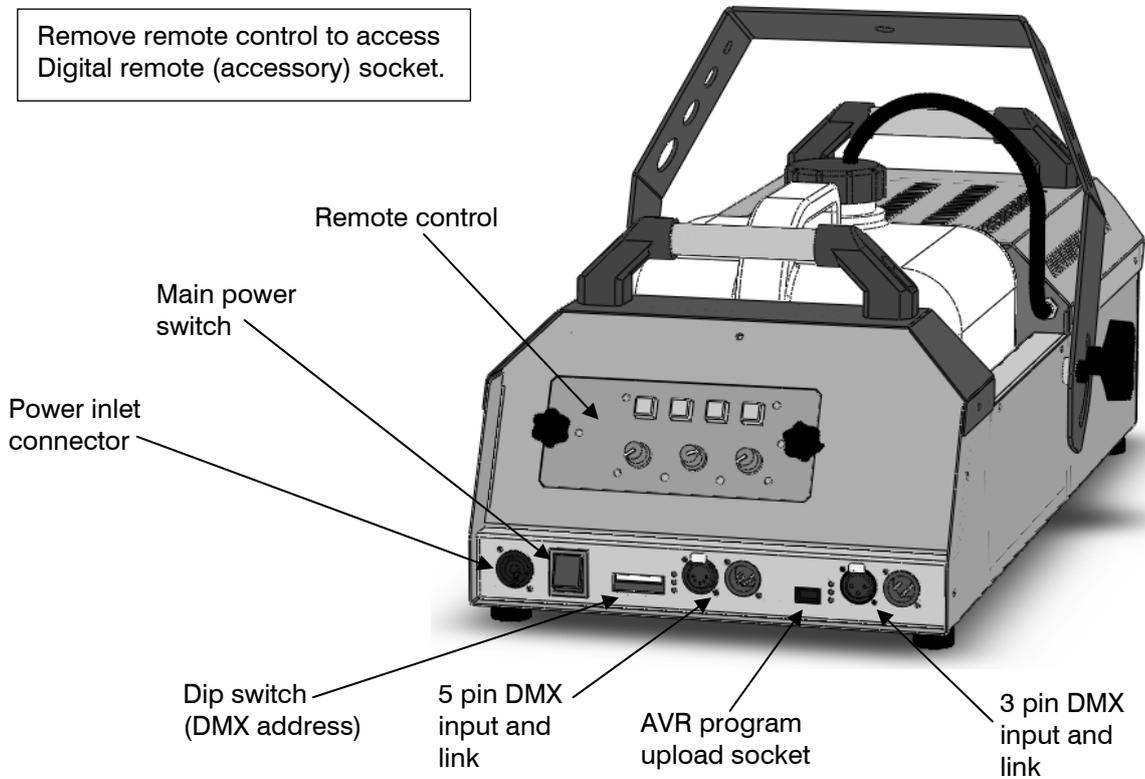
Warning, high
temperature vapour and
surfaces!

Quick Start

You are no doubt eager to switch on the machine and try it out by making a lot of fog. This section tells you how to do that. However, please also make the time to read the safety and servicing instructions in the remainder of this manual.

Setting up

Locate the machine in a suitably large area with nothing in front of the smoke output.

Fill the fluid tank with MARTIN-approved fluid (see page 16).

Connect a suitably rated power supply to the machine. The power requirements are:

8.21A at 230V (EU)
14.58A at 120V (US)

Now set the mains switch, at the rear of the machine, to the 'ON' position and press the grey "stand-by" button.
The 'Ready' LED will flash indicating the machine is heating up; allow around 10 minutes for the machine to reach operating temperature. Once the machine has heated the 'Ready' LED will stop flashing and be permanently on.

Making fog

Once the machine has heated up, hold the FOG button on the remote to start the fog output.

It may be necessary to prime the machine, to do this simply hold down the FOG button and turn the output knob to maximum. Keep the button held until the fog output is strong and steady. Then turn the knob back to the required output level and release the FOG button.

You can set the fog density by turning the knob. If the knob is turned fully anticlockwise, no fog will be produced.

Installation and setting up

DANGER! DO NOT operate the smoke machine until you have read and observed all the precautions listed under "Safety information" on page 4.

Location

The smoke machine may be located on the floor or may be suspended using the flying bracket. If suspending the machine, a standard truss bracket (available from Martin) should be attached to the machines flying bracket with an M12 bolt and nyloc nut.

The machine can operate in any orientation from 45 degrees upwards to 45 degrees downwards. Steeper tilting may cause fluid leakage.

If the machine is to be suspended, ensure the mounting surface can support the weight of the machine. Do not suspend the machine over areas where people will be underneath.

Ensure that there is at least 100mm clearance all round the machine and at least 600mm in front of the smoke output.

AC power

Before using the machine, ensure that a grounding-type (earthed) power plug that fits the local power outlets is installed on the power cable.

DANGER! Make sure the power plug is correctly rated:
• For EU (230V) use fit a plug rated 10 amp minimum
• For US (120V) use fit a plug rated 16 amp minimum

When installing the plug, follow the plug manufacturer's instructions and connect pins as follows:
Yellow and green wire to ground (earth), blue wire to neutral and brown wire to live.

The table below shows some common pin identification schemes.

wire	function	marking	screw colour
brown	live	"L"	yellow or brass
blue	neutral	"N"	silver
green/yellow	earth	⏚	green

Before connecting the smoke machine to power, verify that the AC supply is adequately dimensioned for the current draw of the machine. The machine requires:

8.21A at 230V (EU)
14.58A at 120V (US)

Check that the local AC voltage is appropriate, as indicated on the machine's serial number label. If your AC voltage is outside the appropriate range, do not use the machine. Contact Martin Service for assistance.

Setting up

Fill the fluid tank with MARTIN-approved fluid (see page 16).

If DMX control is being used, connect the machine to the DMX line (see page 15).

Final checks

Before applying power to the smoke machine, verify the following:
- the machine is safely located or installed and meets the location requirements stated on page 10
- the operator is familiar with, and able to comply with, the requirements for safe operation listed on page 4
- the smoke fluid is one of the genuine Martin fluids listed under "Smoke fluid options" on page 16
- the machine is electrically grounded (earthed)
- the AC power distribution circuits and lines are adequately rated for the current load

Turning on the power

Turn on the main power switch located next to the power cable inlet.
The green 'Ready' indicator on the rear of the machine will flash for about 10 minutes as the machine heats up to operating temperature.

When the green Ready indicator stops flashing and is permanently on, the machine is ready to make fog.

Control settings

The unit is controlled using the remote control. You can control it in these ways:

- Manual firing by holding down the FOG button
- Automatic fog bursts using a repeating timer

Manual firing

Hold down the FOG button. The machine will produce fog until you release the button.

If a long burst of fog is produced, after a time the fog output level will be automatically reduced to keep the machine temperature within the operating range. This allows continuous operation, so that the machine does not have to stop and re-heat.

Setting fog output level

Set the knob to the desired output level while firing the machine. The fog output level is always set by the current position of the knob, whether manually firing or in timer mode.

Setting the Timer

FOG BUTTON: Will when the machine has reached operating temperature fire the machine when pressed and held.
STAND-BY BUTTON: This turns the machines electronics on and off.
TIMER VALUE BUTTON: When the timer is being used, the timer values can be adjusted by a factor of 8, i.e. a 5 second minimum run time becomes 40 seconds & a 10 second delay time becomes 1 minute 20 seconds.
TIMER ENGAGE: This will engage the timer to fire the machine according to the present settings.
OUTPUT CONTROL: Turning this knob clockwise will increase the output of the machine, if turned fully anti-clockwise there will be no output.
DELAY TIME CONTROL: This will adjust the amount of time the machine waits between operating when the timer is engaged.
RUN TIME CONTROL: This will adjust the time the machine will operate for when the timer is engaged.
POWER LED: This LED will light when the machine is switched on
CYCLE LED: This LED will light when the timer is engaged and the machine is operating.

Setting the master-slave link mode

It is possible to control several machines from either the onboard remote control or the optional accessory digital remote. The machines are interconnected with DMX cabling via either the 3pin or 5 pin xlr sockets situated on the rear of the machine

 Dip switch 11 located on the rear of the machine must be set to the down position on the master unit.

Digital remote control

A Digital Remote control, available separately, may be used for control of the JEM ZR44 HI-MASS™
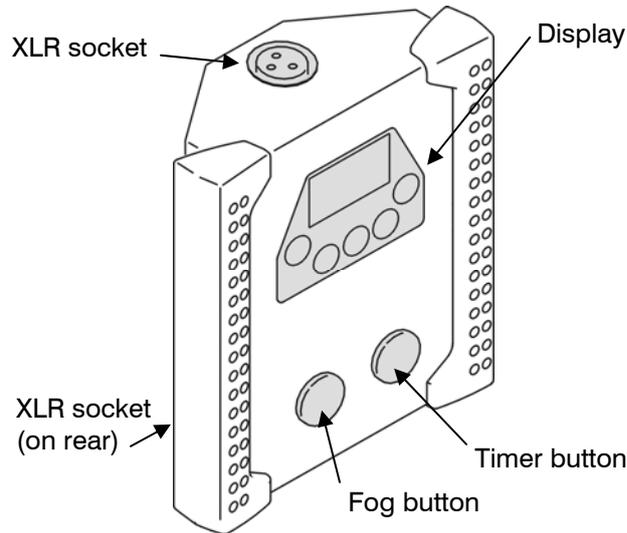
Functions

The remote control provides the following functions:

- Fog button: turns fog output on and off. Press once to start fog and again to stop.
- Timer button: turns the fog timer on and off.
- Fog level setting (Fog = 0 -100%)
- Timer run time/off time settings ($TRUN$, $TOFF$ = 0 - 90 seconds)
- Run mode (RUN = OFF, $STBY$, $TIME$, $CONT$)

The Fog button works by setting RUN to $CONT$ (or $STBY$). The Timer button sets RUN to $TIME$ or $STBY$. These buttons are simply a quick way to control this menu function.

DMX control

Overview

DMX is a digital control system widely used in entertainment and architectural lighting. Any controller meeting the DMX-512 standard may be used to control and program the fog output of the smoke machine.

Connection

The smoke machine provides both 3 & 5pin XLR plug and socket on the rear panel for DMX connection. The wiring is shown below.

Connector pin	function
1	Ground
2	Data − ("Cold")
3	Data + ("Hot")

For best results, use cable designed for high speed digital data transmission. Suitable DMX cable is available from your Martin dealer.

DMX functions

The smoke machine operates from a single DMX channel which gives proportional control of fog density from 0-100%.

DMX Level	function
0 − 12	No fog
13 − 255	Fog at variable density, (13=minimum, 255=maximum)

When the machine is receiving valid DMX data, the indicator light next to the address switches will light.

Setting the DMX address

Each unit on a DMX system must be allocated an address so that the DMX controller can send separate commands to the unit. On the smoke machine, the DMX address is set using the bank of switches ("dip switches") on the back panel next to the DMX connectors. The switch settings for each possible DMX address are given in the table below.

DIP-Switch Setting					#9	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
					#8	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
0 = OFF					#7	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
1 = ON					#6	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
#1	#2	#3	#4	#5																	
0	0	0	0	0			32	64	96	128	160	192	224	256	288	320	352	384	416	448	480
1	0	0	0	0		1	33	65	97	129	161	193	225	257	289	321	353	385	417	449	481
0	1	0	0	0		2	34	66	98	130	162	194	226	258	290	322	354	386	418	450	482
1	1	0	0	0		3	35	67	99	131	163	195	227	259	291	323	355	387	419	451	483
0	0	1	0	0		4	36	68	100	132	164	196	228	260	292	324	356	388	420	452	484
1	0	1	0	0		5	37	69	101	133	165	197	229	261	293	325	357	389	421	453	485
0	1	1	0	0		6	38	70	102	134	166	198	230	262	294	326	358	390	422	454	486
1	1	1	0	0		7	39	71	103	135	167	199	231	263	295	327	359	391	423	455	487
0	0	0	1	0		8	40	72	104	136	168	200	232	264	296	328	360	392	424	456	488
1	0	0	1	0		9	41	73	105	137	169	201	233	265	297	329	361	393	425	457	489
0	1	0	1	0		10	42	74	106	138	170	202	234	266	298	330	362	394	426	458	490
1	1	0	1	0		11	43	75	107	139	171	203	235	267	299	331	363	395	427	459	491
0	0	1	1	0		12	44	76	108	140	172	204	236	268	300	332	364	396	428	460	492
1	0	1	1	0		13	45	77	109	141	173	205	237	269	301	333	365	397	429	461	493
0	1	1	1	0		14	46	78	110	142	174	206	238	270	302	334	366	398	430	462	494
1	1	1	1	0		15	47	79	111	143	175	207	239	271	303	335	367	399	431	463	495
0	0	0	0	1		16	48	80	112	144	176	208	240	272	304	336	368	400	432	464	496
1	0	0	0	1		17	49	81	113	145	177	209	241	273	305	337	369	401	433	465	497
0	1	0	0	1		18	50	82	114	146	178	210	242	274	306	338	370	402	434	466	498
1	1	0	0	1		19	51	83	115	147	179	211	243	275	307	339	371	403	435	467	499
0	0	1	0	1		20	52	84	116	148	180	212	244	276	308	340	372	404	436	468	500
1	0	1	0	1		21	53	85	117	149	181	213	245	277	309	341	373	405	437	469	501
0	1	1	0	1		22	54	86	118	150	182	214	246	278	310	342	374	406	438	470	502
1	1	1	0	1		23	55	87	119	151	183	215	247	279	311	343	375	407	439	471	503
0	0	0	1	1		24	56	88	120	152	184	216	248	280	312	344	376	408	440	472	504
1	0	0	1	1		25	57	89	121	153	185	217	249	281	313	345	377	409	441	473	505
0	1	0	1	1		26	58	90	122	154	186	218	250	282	314	346	378	410	442	474	506
1	1	0	1	1		27	59	91	123	155	187	219	251	283	315	347	379	411	443	475	507
0	0	1	1	1		28	60	92	124	156	188	220	252	284	316	348	380	412	444	476	508
1	0	1	1	1		29	61	93	125	157	189	221	253	285	317	349	381	413	445	477	509
0	1	1	1	1		30	62	94	126	158	190	222	254	286	318	350	382	414	446	478	510
1	1	1	1	1		31	63	95	127	159	191	223	255	287	319	351	383	415	447	479	511

Fog fluid types

The following types of Martin/Jem fog fluid are suitable for use in this machine. Each produces a different effect as described below. Martin supplies high quality fog fluids that are based on ultra-pure deionized water. Use only the following genuine Martin/Jem fog fluids. No other fluid is suitable for use.

DANGER! The smoke machine can run safely only on the specific smoke fluids it is designed for. Use ONLY the Martin/Jem smoke fluids designated in this manual. NEVER use any other type of fluid, or toxic gas may be produced. You will probably also cause damage to the system 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.

Regular DJ Fluid (DJ mix)

Regular DJ fluid is an economical fluid that gives a good, medium density smoke well-suited for atmospheric effects.

Pro Smoke Super (ZR mix)

Pro Smoke Super fluid is a high-quality, general purpose fluid that produces a dense white airborne fog with medium dispersal time. Its medium to high index of refraction permits both good atmospheric effects and denser "white-outs".

Pro Smoke High Density (SP mix)

Pro Smoke High Density fluid generates a high density, white, airborne fog with a very high index of refraction and slow evaporation rate. It is well suited for scenic obscuring, dramatic strobe effects, and "white-outs".

Pro Smoke Studio (DX mix)

In a studio or theater environment, a lighter, faster dispersing fog is often preferred. Pro-Smoke Studio offers a less dense environment to Pro-Smoke Super and is therefore less likely to interfere with TV camera focusing.

i-fog

i-fog is not only kind to your lights, but is also more economical to use thanks to its incredible long "hang time" characteristics. In environments unaffected by extraction and air-conditioning, i-fog can be expected to last

Pro Steam Simulation

Steam simulation fluid specifically designed for 'steam' effects. Creates a white burst, but is fast dispersing.
(In order to optimise the machines temperature setting the dip switch on the rear marked 'Low Temp' should be set down to position 1).

Basic service

Before servicing the smoke machine, read and observe all the precautions listed in "Safety information" on page 4. Any service not described in this section must be carried out by a Martin service technician.

Cleaning

Excessive dust, smoke fluid, and dirt build-up 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 of the machine periodically.

Isolate the machine from power and allow to cool completely before cleaning. The smoke output nozzle remains hot for up to 10 hours after use.

- Remove dust from the air vents with a soft brush, cotton swab, vacuum, or compressed air.
- Clean smoke fluid residues from the fog output of the machine using a damp cloth.
- Clean the outer casing with a damp cloth only.

Fuse replacement

The main fuse for the smoke machine is located on the electronics board inside the unit.

DANGER! Disconnect the power supply before removing any covers. Live parts inside!

To replace the fuse, disconnect the power cord from the supply, unscrew the screws holding the rear cover of the unit and remove the cover. The electronics board is located at the back of the unit.

Remove the spent fuse and replace with one of exactly the same size and rating. The fuse type is indicated below. Contact Martin Service if the fuse blows repeatedly.

120V = 20AT
230V = 10AT

Troubleshooting

Problem	Probable cause(s)	Suggested remedy
Machine will not produce fog when remote control Fog button pressed	Machine not at operating temperature	Wait 10 to 15 minutes
	Machine not powered up or heaters disabled	Ensure mains power switch on, enable heaters by pressing FOG
	Output level control set to zero	Increase setting
Machine continues to produce fog when Fog button is not pressed	Timer is engaged	Disengage the timer by pressing the FOG/TIMER ENGAGE button briefly
Machine can be fired from the remote control, but not by DMX controller	DMX address setting incorrect	Change DMX address (page 15)
	Poor connection in DMX line	Check DMX cables and connections
Smoke output is weak	Machine requires priming	Prime machine (page 9)
Wet, greasy, non-uniform smoke output, fluid drips or spits from nozzles, or very loud noise when firing machine	Incompatible smoke fluid	Use only approved fluid!
Machine appears dead	Mains fuse blown	Replace fuse (page 17)
	No power at AC cable inlet	Check power cable and circuit breaker

Resetting the machine after fluid out

If the machine runs out of fluid it will automatically shut down to prevent any damage occurring, the Low Fluid led on the rear will illuminate. To reset simply turn the mains power off and back on again. Refill the fluid container and follow the priming instructions under 'Making fog' on page 8.

Specifications

Physical

Length 685mm
Width 345mm
Height 225mm
Dry weight 19Kg

Performance

Effect coverage .... $1200m^3$/min
Operating time .... continuous
Warm up time .... 10 minutes
Max' operating time at full output (9.5L) .... 3 hrs 10 min

Control and programming

Control options .... onboard analogue remote control, DMX (3 & 5 pin),
Multi function digital remote control (optional), RDM capable.
Digital link machine to machine (using optional digital remote control)
DMX channels 1

Fluid system

Capacity .... 9.5 L
Fluid consumption (max) 120ml/min
Fluid Sensing .... Indirect for unattended operation

Connections

DMX / RDM .... 3 or 5 pin XLR
Remote / machine link .... 3 pin XLR
AC power .... Neutrik PowerCon

Electrical

AC voltage (EU) 220-240V, 50/60Hz
AC voltage (US) 110-120V, 50/60Hz
Main fuse (EU) 10AT
Main fuse (US) 20AT
Power usage (EU) 1890W (8.21A)
Power usage (US) 1750W (14.58A)

Thermal

Maximum ambient temperature (Ta max) .... 40°C (104°F)
Exterior surface temperature, steady state, at 20°C ambient .... 50°C (122°F)

Approvals

$$C\!\in$$

European EMC: .... EN 61000-6-3:2001
European safety: .... EN 60 335-1:2002
Immunity: .... EN 61000-6-1:2001
ETL approval (pending) .... UL Std.998, CAN/CSA Std. C22.2 No 104-01

Included items:

User manual
Power cable
Onboard remote control
Container 9.5L

Ordering information

Jem ZR44 Hi-Mass™ smoke machine 120V......................................P/N 92215310
Jem ZR44 Hi-Mass™ smoke machine 230V......................................P/N 92215300

Accessories

Digital Multi-function Remote Control ....P/N 92765037
Ducting system ....P/N 92625005
Drip tray..P/N 92620011

Specifications subject to change without notice. For the latest product specifications, see www.martin.com
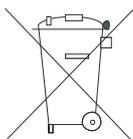
Disposing of this product

Martin™ 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 Martin products.

Notes

Martin