

Heavy Fog

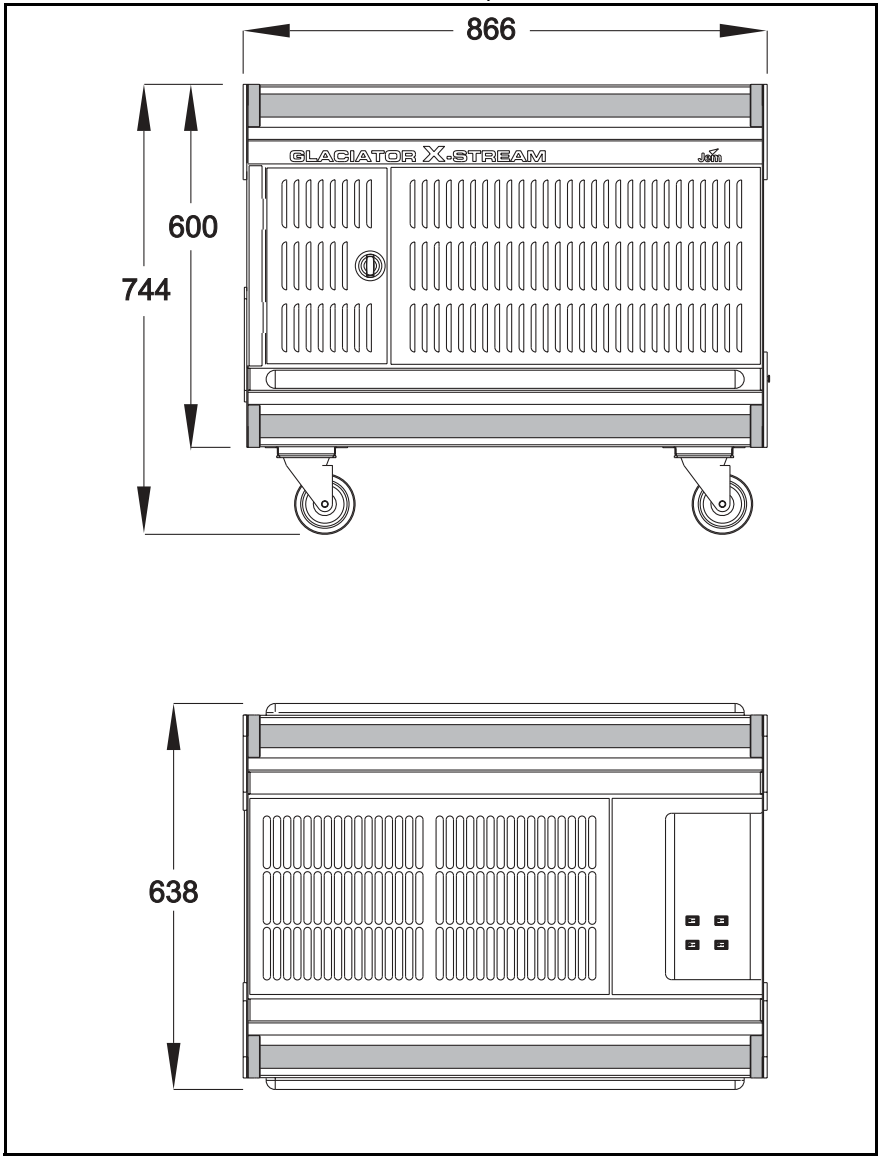
# Glaciator X-Stream

user manual



  
**Jem**

Measurements are expressed in millimeters.



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Printed in United Kingdom.

P/N 35010021, Rev. B

|  |           |
|--|-----------|
| <b>Introduction</b> .....                | <b>4</b>  |
| Features .....                           | 4         |
| Safety information .....                 | 5         |
| Unpacking .....                          | 6         |
| Product overview .....                   | 7         |
| <br>                                     |           |
| <b>Installation</b> .....                | <b>8</b>  |
| Fixture location .....                   | 8         |
| AC power .....                           | 8         |
| Installing a remote fluid system .....   | 9         |
| Ducting .....                            | 11        |
| Remote control configurations .....      | 11        |
| <br>                                     |           |
| <b>DMX-512 setup &amp; control</b> ..... | <b>13</b> |
| Data connection for DMX operation .....  | 13        |
| DMX control address .....                | 15        |
| DMX operation .....                      | 17        |
| DMX protocol .....                       | 18        |
| <br>                                     |           |
| <b>PLC interface</b> .....               | <b>19</b> |
| Pin allocations .....                    | 19        |
| <br>                                     |           |
| <b>Control panel overview</b> .....      | <b>20</b> |
| Display .....                            | 20        |
| Control switches .....                   | 23        |
| Messages .....                           | 24        |
| <br>                                     |           |
| <b>General operation</b> .....           | <b>26</b> |
| Fluid .....                              | 26        |
| The refrigeration system .....           | 28        |
| Starting the Glaciator X-Stream .....    | 29        |
| Producing timed output .....             | 30        |
| <br>                                     |           |
| <b>Basic service</b> .....               | <b>31</b> |
| Cleaning .....                           | 31        |
| Fuse replacement .....                   | 31        |
| Filter replacement .....                 | 34        |
| Firmware updates .....                   | 34        |
| <br>                                     |           |
| <b>Troubleshooting</b> .....             | <b>37</b> |
| <br>                                     |           |
| <b>Specifications</b> .....              | <b>38</b> |

# INTRODUCTION

The Heavy Fog Glaciator X-Stream is designed for touring and installation in a variety of applications. It can be easily integrated with most control systems currently used in the entertainment industry. As well as the on-board control panel, the fixture can be operated via a PLC remote, a JEM remote control, or via a DMX control device.

The Heavy Fog effect is provided by cooling the smoke output from the main heat exchanger until it is at a temperature lower than the ambient in which the device is operating. Air is added to the smoke, prior to cooling, from the fan mounted in the rear of the device. This increases the volume of the effect and allows the output to be pushed through ducting.

A fluid container with 5L capacity (1.3US Gal.) is provided for Heavy Fog fluid. To allow reliable unattended operation, the fluid level is monitored electronically, and the device shut down if necessary. The fixture can be connected to a remote fluid system for longer-running applications.

All devices come with robust transport handles and heavy duty braked castors. A ducting adaptor is available as an accessory.

## FEATURES

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The Glaciator X-Stream features:

- Onboard 5L fluid capacity with the remote fluid system capability
- Electronic pump ramping system that enables continuous operation
- Electronic expansion valve
- Remote control interface
- Powerful 3.5kW heat exchanger enables high-volume output
- Two-channel DMX512 interface enabling to control from a DMX control device
- Integrated PLC interface, enabling control via PLC
- Non-volatile memory for user settings
- Electronic low fluid detection warning
- High pressure piston pump

- LED displays for FOG and ICE controls
- Fog and density controls for easy set-up
- Timer functions
- Two-speed condenser fans enable reduced noise operation

## SAFETY INFORMATION

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

Read this manual before powering or installing the device, follow the safety precautions listed below and observe all warnings in this manual and printed on the device (yellow labels). If you have questions about how to operate the device safely, please contact a Jem distributor for assistance or call the Martin 24-hour service hotline at +45 70 200 201.

Refer any service operation not described in this manual to a qualified technician.

### Preventing electric shocks

- Always ground (earth) the device 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.
- Check the voltage is correct for use with the fixture. The voltage setting is printed on the serial label.
- Disconnect the device from AC power before refilling the fluid tank or servicing, and when not in use.
- This machine is not waterproof, and should not be exposed to wet outdoor conditions.
- Do not spill fluid over the machine. If fluid is spilled, clean the fixture with a damp cloth. If fluid is spilled onto electronic parts, contact an approved Jem dealer for advice.
- Do not remove the covers or attempt to repair a faulty machine.
- Refer all service to an authorized JEM dealer.
- Never operate the device with damaged or missing parts.

## Preventing burns and fire

- Never attempt to bypass the thermostatic switch or fuses. Always replace defective fuses with ones of the specified type and rating.
- Ensure that the air flow through fans and vents is free and unobstructed.
- Provide a minimum clearance of 0.5 meters (20 inches) around fans and air vents.
- Do not touch output nozzle during or after usage; it may stay hot for up to 14 hours.
- Do not operate the device if the ambient temperature ( $T_a$ ) exceeds 40° C (104° F).

## Preventing injuries due to falls

Smoke machines can cause condensation to form. Floors and surfaces may become slippery and should be checked regularly.

## Preventing breathing problems

- Always use smoke machines in well ventilated areas, over-use could affect sufferers of asthma or other chest conditions.
- Keep the nozzle at least 1 meter (39 inches) away from people and objects.
- Never point the output directly at a person.

## UNPACKING

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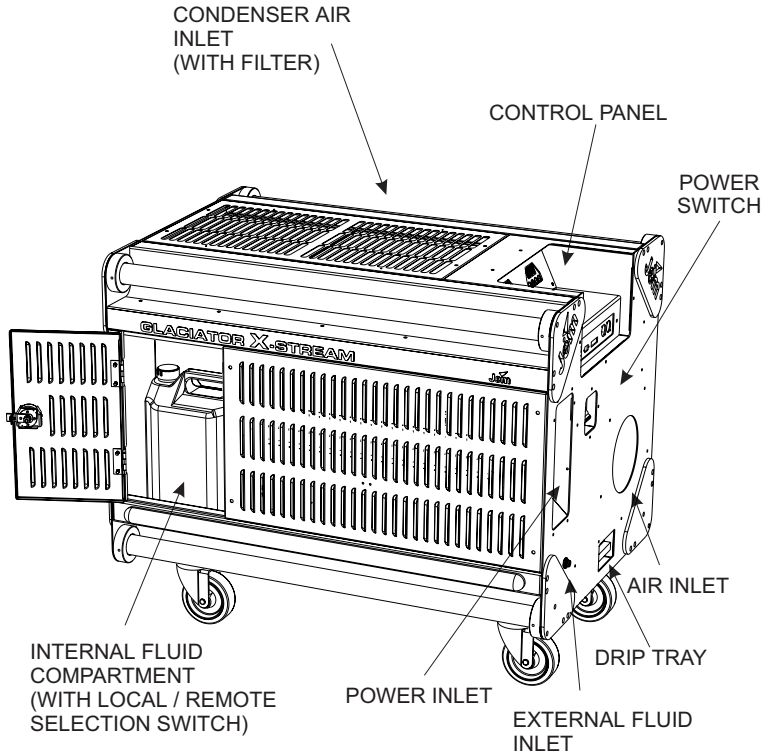
Unpack the machine and look for any obvious signs of damage.

The Glaciator X-Stream comes with the following:

- User manual
- 5 liter fluid bottle
- C-form socket (model 230V / 50Hz models only)

# PRODUCT OVERVIEW

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# INSTALLATION

The chapter describes:

- “Fixture location”, below
- “AC power”, below
- “Installing a remote fluid system” on page 9
- “Remote control configurations” on page 11

## FIXTURE LOCATION

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- 1 Place the machine on a level surface and ensure that it is stable.
- 2 Ensure that there is a minimum clearance of 0.5 meters (20 inches) around fans and air vents. Otherwise the device may overheat and the thermostatic switch will temporarily cut the power.
- 3 Read “Safety information” on page 5 and ensure that the fixture is located so that the safety requirements are met.

## AC POWER

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The Glaciator X-Stream is available in two models:

- 208V / 60Hz version (200-220V supplies)
- 230 V / 50Hz version (220-245V supplies)

**Warning!** *For protection from dangerous electric shock, the device must be grounded (earthed). The AC mains supply shall have overload and ground-fault protection.*

*Verify that the feed cables are undamaged and rated for the current requirements of all connected devices before use.*

*Consult a qualified electrician if you have any doubts about proper installation.*


The:

- 230 V / 50 Hz version of the Glaciator X-Stream is fitted with an IEC 32A single phase connector.



- 208V / 60Hz version of the Glaciator X-Stream, uses a cable that must be hard wired to the power supply. To connect to 208V supplies, the neutral conductor can be connected to the second phase of the 120V system, while phase 1 is connected to the live conductor.

In some cases the Glaciator X-Stream's mains lead may require a grounding-type cord cap that fits your power distribution cable or outlet. Following the cord cap manufacturer's instructions when installing. 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  |  | green           |

## INSTALLING A REMOTE FLUID SYSTEM

A remote fluid supply can be installed and used by one or more Glaciators.

A remote fluid system makes it possible to obtain longer run times by using a remote supply that can be up to 100 metres (330 feet) away from the machine if a suitable slave pump is used at the reservoir.

If the reservoir is more than 6 meters away a slave pump will be required. The most suitable type of pump, is a diaphragm unit similar to 'FloJet' style 2100, which includes a pressure switch. To prevent the liquid being forced through the internal pumps, the maximum pressure in the feed line to the machine should be 3 bar (44psi).

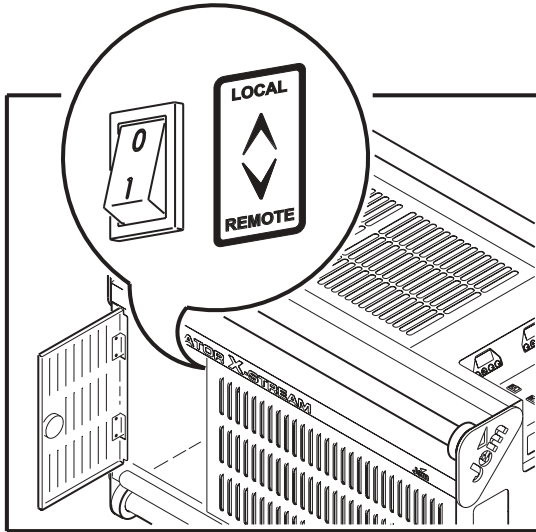
**Note:** *All pressures are quoted as gauge pressure.*

When using a remote slave pump, the suction line must be fitted with a suitable filter (Martin P/N 26480020, orderable from your Jem or Martin dealer).

**Warning!** *The local fluid sensor will be disabled when the machine is in remote mode.*

When installing and using a remote fluid system:

- 1 Select the remote fluid system as the fluid source by opening the door of the fluid compartment and setting the toggle switch mounted in the top of the compartment side panel to the 'Remote' position.



- 2 Fit the fluid line from the remote reservoir onto the Glacier X-Stream's Push in connector. The remote fluid connection is a 6 mm (0.24 in.) 'push fit' style pneumatic fitting, and should be used with nylon or PTFE tubing that has a 10 bar (145 psi) pressure rating.
- 3 To prime the pumping system, the Ice switch should be set to OFF, to allow the machine to run the pumps at maximum output. Alternatively, wait until the refrigeration system cools to below -15, at which point the pump ramping system will become inactive, and maximum output will be available.

## Low-fluid warning on remote supply

The local fluid sensor will be disabled when in remote mode, but a remote system such as a PLC can shut the machine down by using pin 5 of the interface connector (9-way D-type).

To prevent the fog machine from running dry a fluid sensor can be installed at the remote fluid supply. To indicate low fluid, the input on pin 5 must be pulled low, relative to the ground on pin 6. Ground isolation should be provided between the two systems, by using relays or optoisolators.

An output, which is active when the machine is firing, is provided on the 9-way D-type connector (pins 8 & 9). This signal can be combined with the signal from a pressure switch, to control the remote pump which must

have a maximum output pressure of 3 bar (44 psi). These contacts are voltage free, and allow the remote pump to be active only when the machine is fired.

As the contacts are voltage free, they can be connected in parallel with the signals from other Glaciator X-Streams which share the same fluid supply. This forms a 'wired or' function, which enables the pump when any or all machines are operated. The output must not be used to control mains (line/net) voltages directly.

## DUCTING

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When ducting is fitted to the fixture, locate the DIP switches under the control panel, and set DIP switch 10 (marked as 'S1') to on. This setting allows the fan to run on a further six seconds after the fixture has finished firing. This clears the ducting of any smoke, thereby preventing the build up of condensation.

## REMOTE CONTROL CONFIGURATIONS

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The Heavy Fog Glaciator provides three remote control methods:

**PLC interface** This connection is an option available to installers who wish to control the machine using the outputs from a standard Programable Logic Controller (PLC).

The interface allows 'voltage free' control signals to switch the Fog, Standby, Timer and Ice functions. The output levels and timer settings must be made using the Glaciator X-Stream control panel. This interface is further described in "PLC interface" on page 19.

**JEM remote control** A JEM remote control can be connected to the Remote interface. The remote uses a standard 3-pin XLR connector. You can control the amount of fog ia the remote, but the density (fan) level must be set using the control panel on the Glaciator X-Stream.

Contact your Martin or Jem dealer to order a remote control.

The pin configuration of the remote connection is:

Pin 1 - Ground

Pin 2 - 12 volt output

Pin 3 - Input

**DMX-512  
control**

When using other equipment such as lights together with the fog machine the industry standard DMX-512 control protocol provides an easy solution for controlling all equipment from one place. The interface allows 'voltage free' control signals to switch the Fog, Standby, Timer and Ice functions. The output levels and timer settings must be made using the Glaciator X-Stream control panel.

This interface is further described in "DMX-512 setup & control" on page 13.

Integration with the lighting system is possible in most installations, consult your Martin dealer for further detail.

All the interfaces are located on the panel adjacent to the control panel.

# DMX-512 SETUP & CONTROL

The Glaciator X-Stream can be operated via a DMX control device. The interface uses the two XLR 3-pin connectors marked DMX on the interface panel, and uses the usual DMX electrical standards (RS 485). The inputs are protected against overvoltage and an output connector is provided to allow multidrop operation of the link.

The chapter describes:

- “Data connection for DMX operation”, below
- “DMX control address” on page 15
- “DMX operation” on page 17
- “DMX protocol” on page 18

## DATA CONNECTION FOR DMX OPERATION

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This section describes how to connect fixtures to each other, or to a DMX control device.

### Recommended cable

A reliable data connection begins with the right cable. Standard microphone cable cannot transmit DMX data reliably over long runs. For best results, use cable specifically designed for RS-485 applications. Your Martin dealer can supply high quality cable in various lengths.

### Connections

The Heavy Fog Glaciator X-Stream's XLR data sockets are wired with pin 1 to ground, pin 2 to signal - (cold), and pin 3 to signal + (hot). This is compatible with the standard for DMX devices.

One or more adaptor cables may be required to connect the Heavy Fog Glaciator X-Stream to the controller and/or other lights because many

devices have 5-pin connectors and others may have reversed signal polarity, that is, pin 2 hot and pin 3 cold.



| 5-pin to 3-pin Adaptor |        |
|------------------------|--------|
| Male                   | Female |
| 1                      | 1      |
| 2                      | 2      |
| 3                      | 3      |
| 4                      |        |
| 5                      |        |
| P/N 11820005           |        |



| 3-pin to 5-pin Adaptor |        |
|------------------------|--------|
| Male                   | Female |
| 1                      | 1      |
| 2                      | 2      |
| 3                      | 3      |
|                        | 4      |
|                        | 5      |
| P/N 11820004           |        |

| 3-pin to 3-pin Phase-Reversing Adaptor |        |
|--|--------|
| Male                                   | Female |
| 1                                      | 1      |
| 2                                      | 3      |
| 3                                      | 2      |
| P/N 11820006                           |        |

### Connecting the data link

- 1 Connect a data cable to the controller's output. If controller has a 5-pin output, use a 5-pin male to 3-pin female adaptor (P/N 11820005).
- 2 Lead the data cable from the controller to the first fixture. Plug the cable into the fixture's data input.
- 3 Connect the output of the fixture closest to the controller to the input of the next fixture. If connecting two fixtures with opposing polarity on pins 2 and 3, insert a phase-reversing cable between the two fixtures.
- 4 Continue connecting fixtures output to input. Up to 32 devices may be connected on a serial link.
- 5 Terminate the link by inserting a male termination plug (P/N 91613017) into the data output of the last fixture. A termination plug is simply an XLR connector with a 120 ohm, 0.25 W resistor soldered across pins 2 and 3.

| Male Termination Plug   |
|---|
| Male XLR  |
| 1<br>2  120<br>3  120 |
| P/N 91613017  |

| Female Termination Plug   |
|---|
| Female XLR  |
| 1<br>2  120<br>3  120 |
| P/N 91613018  |

## DMX CONTROL ADDRESS

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The control address, also known as the start channel, is the first channel used to receive instructions from the controller. Each fixture needs its own control address set, and uses this address and subsequent control channels to receive instructions from a controller. The Heavy Fog Glaciator X-Stream uses two control channels.

The Heavy Fog Glaciator X-Stream reads the data on the start channel and the next channels. If the DMX control address is set to 100, the fixture uses channels 100 and 101. Channel 102 could be the control address for the next fixture.

For independent control, each fixture must be assigned its own address and non-overlapping control channels. If two or more fixtures are set up with the same address, they will receive the same instructions and should behave identically. Setting up identical fixtures with the same address is a good tool for troubleshooting unexpected behavior and an easy way to achieve synchronized action.

### Specifying a DMX control address

The DMX control address can be set to any channel in the range 1 - 511 using DIP-switches 1-9:

- 1 Select an address for the fixture on your controller. If you are calculating the DMX addresses for multiple fixtures then the Martin Address Calculator is available on the internet at <http://www.martin.dk/service/utilities/AddrCalc/index.asp>
- 2 Look up the DIP-switch setting using the Martin DIP Switch Calculator (also available on the internet, at <http://www.martin.dk/service/dipswitchpopup.htm>), or look for the address in the following DIP-switch settings table.
- 3 Disconnect the fixture from power.
- 4 Set pins 1 through 9 to the ON (1) or OFF (0) position as listed in the following table.

Find the address in the following table. Read the settings for pins 1 - 5 to the left and read the settings for pins 6 - 9 above the address. "0" means OFF and "1" means ON. Pin 10 is always OFF for DMX operation.

| DIP-Switch Setting |    |    |    |    | #9 | 0  | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1 |
|--------------------|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 0 = OFF            |    |    |    |    | #8 | 0  | 0  | 0   | 0   | 1   | 1   | 1   | 1   | 0   | 0   | 0   | 0   | 1   | 1   | 1   | 1 |
| 1 = ON             |    |    |    |    | #7 | 0  | 0  | 1   | 1   | 0   | 0   | 1   | 1   | 0   | 0   | 1   | 1   | 0   | 0   | 1   | 1 |
| #1                 | #2 | #3 | #4 | #5 | #6 | 0  | 1  | 0   | 1   | 0   | 1   | 0   | 1   | 0   | 1   | 0   | 1   | 0   | 1   | 0   | 1 |
| 0                  | 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 |   |



## DMX OPERATION

---

***Important!*** ***To ensure correct operation of the displays, the standby switch should be set to the ON position when using DMX.***

DMX may be used without changing any of the settings on the main control panel. When the system detects a valid DMX data stream on the input, the control will default to the DMX system levels. Any attempt to control the machine from the control panel will have no effect until the DMX signal is removed. Though it is impossible to operate the machine from its control board while using DMX512, the displays will show the current input values for Fog and Density.

DMX control uses two channels:

**Channel 1** controls level of fog output.

**Channel 2** controls the density of the fog, by adjusting the speed of the fan that pushes the fog out.

For detailed information refer to “DMX protocol” below.

The system implements true proportional control of the fog output rather than the simple switching functions found on other equipment. The output levels of FOG and FAN are linked during DMX operation via the Density setting.

The machine uses a 'pump ramping' technique to allow continuous operation. This means that transmitting DMX 100% will cause the machine to run at full output until the temperature falls and the output is automatically reduced. The output will remain at this level until the DMX signal is reduced, or the fluid is exhausted. There is no possibility of damage, since the electronic fluid level sensor will shut the machine down (if local fluid supply is used). The fan output level is affected by the ramping system via the Density setting.

***Note!*** ***The onboard timer functions are not accessible via the DMX system. Any timing of the output must be done using the programming capabilities of the DMX console.***

# DMX PROTOCOL

---

| Channel | Value  | Percent | Function  |
|---------|--------|---------|---|
| 1       | 0-32   | 0-12    | <b>FOG output level</b><br>Zero output (dead-band)                |
|         | 33-255 | 13-100  | Proportional output level control - from low to high              |
| 2       | 0-32   | 0-12    | <b>Compressor switching and density setting</b><br>Compressor off |
|         | 33-65  | 13-25   | Low density fog (fast speed fan speed)                            |
|         | 66-98  | 25-38   | Normal density (medium speed fan)                                 |
|         | 99-255 | 39-100  | High density (low speed fan)                                      |

# PLC INTERFACE

The PLC interface connector is operational without the need to fit an extra interface PCB to the machine. This allows installers to control the functions of the machine using active low signals from a PLC or other automatic control system. The fog and density levels must be preset on the display units, or alternatively, a 0-10V signal can be used at the remote interface connector (XLR3).

Since the interface has no opto-isolators, the external control system should use voltage free contacts or opto-isolated outputs to control the machine. The signals are active low, and need a threshold voltage of 1.5V or less at 2mA to activate the functions.

The internal circuits of the interface offer very little overload or interference protection, meaning that any control device should be located physically close to the machine. This will prevent problems due to long cable runs etc.

The special function pin 5 of the interface connector (9 way D-type) is now allocated to allow the machine to be shut down by a remote fluid sensing system. The input is active low and has the same electrical specification as the other inputs.

To allow the external fluid system to use a remote pump, a 'normally open' contact is connected to pins 8 and 9.

## PIN ALLOCATIONS

---

|   |                      |
|---|----------------------|
| 1 | Fog                  |
| 2 | Standby              |
| 3 | Timer                |
| 4 | Fan                  |
| 5 | Shutdown (low fluid) |
| 6 | Ground               |
| 7 | N/C                  |
| 8 | Remote pump run A    |
| 9 | Remote pump run B    |

# CONTROL PANEL OVERVIEW

This section describes the Glaciator X-Stream:

- “Display” below
- “Control switches” on page 23
- “Messages” on page 24

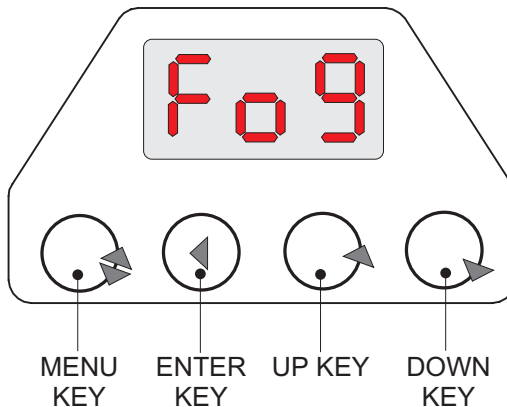
The onboard control panel consists of four control switches and two LED displays, which show all information relating to fog and ice.

## DISPLAY

---

Two LED displays are used on the control panel to show status and control information. The left display shows all information for the fog generation functions of the machine, whilst the right display shows the information for the Ice functions.

Located below each display are four function keys that can be used to control the display and the settings on the machine. The functions of the keys are shown in the following drawing.



## Menu key

Pressing the menu key once will display the current menu function, whilst pressing it more times or holding it down will scroll through the available menus.

## Enter key

The enter key is used for storing selected values into non-volatile memory. If the enter key is not pressed the selected value will be stored in Flash memory, which means that they will not be remembered by the machine next time it is powered.

## Up/Down key

The up and down keys are used for selecting values according to the accessed menu. The keys can be operated with single keystrokes or held down to scroll through the available options.

After approximately 15 seconds since the last keystroke, the display will leave the edit mode and revert to displaying the current status information. If the values have not been stored by pressing the enter key these will only apply until the machine is shut down.

When not in edit mode, the display will show information appropriate to the current operating mode. The display will alternate between two messages, e.g. 'Fog' and '16'. The first message shows the menu, and the second one shows the value chosen for this menu. Some messages are compounded together to form one message, e.g. 'FLu/Lo' indicating low fluid in the fluid container. For more information about the messages to expect, see the section 'DISPLAY MESSAGES' for a complete list of the messages and the circumstances under which they are displayed.

The menus available on each display and the functions they perform are as follows:

## Fog Display

- Fog** Sets the current Fog output level in the range 0 to 20 (0 - 100% fog output).
- Ton** Sets the ON time of the Timer in the range 0 to 90 (seconds). The timer is enabled by setting the Timer switch on the control panel to ON. While the timer is running, the left-hand display will show the elapsed time in seconds. The display will alternate between the period name (ton/toF) and the elapsed time in seconds. To set the time periods, use the Menu key on the left-hand display to access the ton or toF menu. Press the Enter key to see the current value, and - if needed - make adjustments using the Up/Down keys. Press enter to store a new value. Enable the Timer switch on the control panel to test the settings. The current Fog and Density levels will be used by the timer system when in the ON period.
- ToF** Sets the OFF time of the Timer in the range 0 to 90 (seconds).

## Ice Display

- Den** Sets the output density level (Lo, Nor, Hi). The Low, Normal & High density settings are used to relate the fan speed to the current level of fog output. Use Lo density when using ducting to get maximum thrust from the fan, and use Hi density to create a very dense effect (although with reduced volume). The ramping control system may override the density setting if required.

- SuP** Sets the supply voltage in the range 200 to 250V.

Variations in pump performance due to supply frequency differences (50/60Hz), are compensated for automatically. Supply voltage changes will also affect the pump performance, and can be catered for by using this menu to adjust the voltage to match the local power supply voltage (valid range is 200 - 250V). Press the enter key to store the new setting in non-volatile memory. The pumps will now run at the optimum level for the conditions.

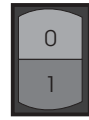
- Ice** Displays current system temperatures.

The software that controls the displays and the other functions of the machine is stored in 'Flash' memory on the DMX receiver PCB. As new features become available, this program code can be updated by using the Martin Uploader programming device for the AVR microprocessor.

# CONTROL SWITCHES

---

The control panel provides a means to enable the various functions that control the Fog and Ice operation. The latching switches are used to set the operating mode of the machine and are used individually or in combination. The layout of the control panel is shown in the following drawing.



TIMER



ICE



FOG



STANDBY

## Standby

The standby switch brings the machine into operating mode and will start the heater. This switch must be ON to use the Fog switch or the Timer. When Standby is OFF, the machine will display OFF on both displays. When standby is set to ON, and the machine is ready, Rdy will show on the Fog display. This will happen after approximately 8 minutes.

## Fog

Gives Fog output at the level currently set using the display system. The machine must be ready before fog can be produced.

## Ice

Setting this switch to ON, will start the refrigeration system. To reach pressure equalization there will always be a delay of up to 20 seconds before the compressor starts. The temperature in the cooling system will be shown on the right display. For best result let the machine cool for at least 30 minutes before firing. The machine will reach its minimum temperature of minus 42°C in approximately 45 minutes. This temperature will allow for the longest possible runtime at full output, and the fog staying low to the ground for the longest possible time. This function is independent of the status of the STANDBY switch.

Also see “Power saving mode” on page 28.

## Timer

Pressing the Timer switch will cause the timer to start from the beginning of the ON period and run through to the end of the OFF period, the cycle

will then repeat itself until the Timer switch is set to OFF. Switching the Timer to OFF at any time during the cycle will halt the operation.

The Timer will only function when the Standby switch is set to ON and the machine is ready (RdY). The Timer can be switched on when powering up the machine, though this will cause the timer to start running, and smoke being fired, as soon as the machine is showing 'RdY' on the display (after approximately 5 minutes). At this point the smoke may not come out as a low fog since the evaporator coils may not yet have been cooled down.

The timer function is controlled by the machine's main control PCB, which make it more accurate than the usual analogue timers commonly found on fog machines.

## MESSAGES

---

### Fog Display

|                        |   |
|------------------------|---|
| <b>Fog/oFF</b>         | Displayed when the Standby switch is set to OFF, indicating that the machine can not be fired and the heaters are OFF.                                  |
| <b>Fog/Err</b>         | Shows that the Standby switch is ON but the heater is not on. This is an error condition and should not normally occur.                                 |
| <b>Fog/Ht</b>          | Displayed when the heater is running but the machine is not ready.  |
| <b>Fog/rdy</b>         | The machine is ready to fire using the Fog or Timer switches.   |
| <b>Fog/08</b>          | The FOG switch is being used to fire the machine. The number displayed is the current Fog output level in the range 0 to 20                             |
| <b>FLu/Lo</b>          | Indicates that the fluid in the container is below the minimum level to operate the machine. Only visible when the machine has reached its ready state. |
| <b>ton/04 - toF/03</b> | The Timer switch is being used. The numbers displayed are the current Timer ON-period and OFF-period in seconds.  |



# Ice Display

|                |   |
|----------------|---|
| <b>dEn/oFF</b> | Displayed when the Standby switch is set to OFF, indicating that the machine can not be fired and the fan is OFF. |
| <b>dEn/nor</b> | Shows the current Density setting.  |
| <b>SuP/220</b> | Shows the current supply voltage setting.   |
| <b>Ice/-24</b> | Shows the current system temperature.   |

# GENERAL OPERATION

This chapter contains the following sections:

- “Fluid”, below
- “The refrigeration system” on page 28
- “Starting the Glaciator X-Stream” on page 29
- “Producing timed output” on page 30

## FLUID

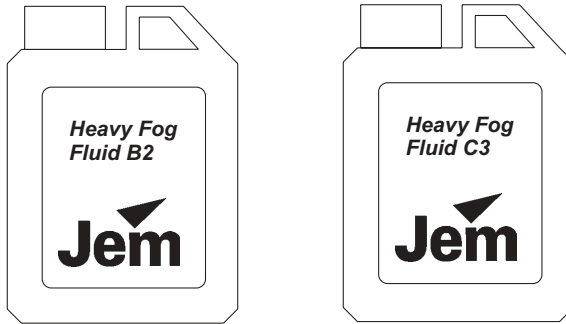
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***Important!*** ***The warranty on this machine is conditional on the use of genuine JEM / Martin fluid only. Other fluids may represent a health hazard when used in this machine, and may damage the internal components by clogging the heating element or spitting from the nozzle.***

***Warning!*** ***Do not bypass the fluid sensor, this could cause damage to the machine.***

The Glaciator X-stream has an on-board 5L (1.3 US Gal.) container that provides approximately 1.5 hours of continuous operation at full output. This will vary with the power supply voltage, which will determine the maximum continuous output level. A remote fluid system can also be installed (see “Installing a remote fluid system” on page 9).

## Fluid types



The type of fluid used will play a large part in determining the resulting effect. Choose a fluid suitable for the venue and type of effect you want to create. The following fluids are compatible with the Glaciator X-Stream:

- Heavy Fog Fluid B2
- Heavy Fog Fluid C3

For normal operation we recommend the standard B2 fluid. For longer lasting effects we recommend C3. Contact a JEM / Martin distributor for advice on using other fluid grades/types.

## Pump ramping

The system uses a technique called 'Pump Ramping' to allow continuous fog output during the entire operation period. When the output level is set to maximum, the machine will give maximum output until the heat exchanger has used its energy reserves after approximately 1 minute. The pump ramping system will then override the output level setting and reduce the pump speed for the rest of the operation period. This ensures that the output will be continuous, although at a reduced level.

## Fluid sensing system

The pump can be damaged if the machine runs out of fluid and an the electronic fluid sensing system ensures that the pump is shut down when the fluid level is too low. The Left-hand display will show a Lo Flu message to warn the user that the pump is shutting down due to lack of fluid.

## Drip tray

When operating the machine for long periods, there will always be a build-up of condensation in the evaporator unit. This will drain into the drip tray, which should be emptied regularly.

For installation, an optional drain hose can be fitted. The drip tray access hole has a 6 mm (1/4 in.) push-in elbow located in the roof. You can fit 6 mm (1/4 in.) nylon piping into this by simply pushing the piping into the fitting. This will allow extended drainage. Your Jem or Martin dealer can supply you with a fluid line head (P/N 62520020).

## Changing the onboard fluid bottle

The local fluid system uses a 5 liter container (1.3 US gallon) that provides approximately 1.5 hours of continuous operation at full output. To change the bottle:

- 1 Remove the empty fluid bottle from its compartment.
- 2 Fit a new container of fluid into the fluid compartment (or refill the empty bottle).
- 3 Remove the container cap (if new bottle has been used) and screw on the tank adaptor cap.
- 4 Ensure that the tube with fluid filter reaches the bottom of the tank.

## THE REFRIGERATION SYSTEM

---

To cool the smoke down to a fog the machine utilizes a 'refrigeration system'.

The refrigeration system is switched on and off using the ICE switch on the control panel. There will be a delay of 10 to 30 seconds while the system pressures equalize, followed by the motor starting. During the motor start cycle, the heaters are switched off to reduce the peak current draw.

## Power saving mode

If the machine is not fired, the evaporator temperature will drop to -25°C or lower and a timer will start. When the unit has been at this temperature (without being fired) for approximately 20 minutes, the system will shut down and enter the power saving mode. Power save mode will continue until the machine is fired, or the evaporator temperature reaches -4°C.

If the ICE switch is ON, but the compressor is not running, the system is in power save mode. It will restart when the smoke system is fired (from any signal source) or when the ice switch is cycled. The starting delay will depend on the current evaporator temperature, but will not prevent immediate production of fog at full output.

To check the status of the refrigeration system at any time, use the ICE menu on the right hand display panel. The left hand panel will now display the name of the value, while the right hand display will show the temperature. Use the scroll keys on the right hand display to move through the available values.

## Evaporator fan control

When the current firing cycle is over, the evaporator fan will run at maximum speed for 3 seconds to clear the remaining smoke from the evaporator compartment. To allow for machines with ducting on the output, a special extended run mode can be selected. By setting the special function switch 1 (s1) to ON (down), a 6 second run-on time for the evaporator fan can be selected. Remember that the density setting for ducting is 'Lo', since this gives the greatest fan speed for any given fog output level.

The evaporator fan may run at other times to assist in the control of the refrigeration system.

## Condenser temperature control

The radial blowers used to cool the condenser unit are powered from a 2 speed relay which is controlled by the machine's microprocessor. The speed of the fans is determined by the temperature of the condenser unit and the thermal load on the evaporator. The control software uses a timer to prevent short-cycling of the speed controller. Under almost all ambient conditions, the fans should run at low speed when the machine is idling, but when fired, the system will switch to high speed. The high speed running will continue after the end of the current firing cycle, and is timed according to the temperature of the condenser unit.

## STARTING THE GLACIATOR X-STREAM

---

To start Glaciator X-Stream from a 'cold' state:

- 1 Connect and apply power.

- 2 Set the Standby switch to ON. The Fog display should show 'FOG/Ht' and the Ice display should show 'Den/nor'.
- 3 Set the Ice switch to ON.
- 4 Set the Fog output to the appropriate level by pressing the menu key on the left display once, and then adjusting the output level using the up/down keys. Press Enter to store the value (so that it will be the stored for the next time the fixture is used).

**Note:** *If you are starting the machine for the first time or after the fluid has been changed, the pump may need to be primed. Do this by setting the fog output to 20 (100% output) and firing the machine for 10 seconds or until fog is produced at the output. The unit may not prime properly if the ice system is not at -15 degrees Celsius (5 degrees Fahrenheit) or below because the ramping system is on and not allowing for 100% output. The ramping system can be overcome by switching the ICE switch to off, and then priming the pump.*

When the machine is ready, after approximately 8 minutes heat-up time, fog can be produced. The machine should be left for at least another 22 minutes to allow for best results.

- 5 Set the Fog switch to ON to produce continuous output of Heavy Fog. The Fog display should show 'Fog/14' and the Ice display should show 'Den/nor'.

To check the status of the refrigeration system at any time, use the ICE menu on the right hand display panel. The left hand panel will display the name of the value, while the right hand display will show the temperature. Use the scroll keys on the right hand display to move through the available values.

## PRODUCING TIMED OUTPUT

---

To produce timed output:

- 1 Configure the 'ton' and 'toF' menus on the left display, setting the on and off periods.
- 2 Set the Timer switch to ON. The Fog display should show ton/04, toF/03 and the Ice display should show 'Den/nor'.

**Note:** *The Fog switch overrides the timer switch.*

# BASIC SERVICE

This chapter describes the maintenance procedures that you can perform yourself:

- “Cleaning”, below
- “Fuse replacement” on page 31
- “Filter replacement” on page 34
- “Firmware updates” on page 34

## CLEANING

---

Regular cleaning of the exterior elements, as well as the fans and air vents, is vital to maintaining the operational quality of the Glaciator X-Stream.

***Important! Excessive dust, smoke fluid, and particulate buildup degrades performance and causes overheating and damage to the device that is not covered by the warranty.***

### Cleaning the fan and air vents

To maintain adequate cooling, dust must be cleaned from the fan and air vents periodically. Remove dust from the fan and air vents with a soft brush, cotton swab, vacuum, or compressed air.

## FUSE REPLACEMENT

---

The Glaciator X-Stream uses six fuses. An indication that one of the fuses may have blown is that when power is applied the condenser fan does not operate or the compressor will not start.

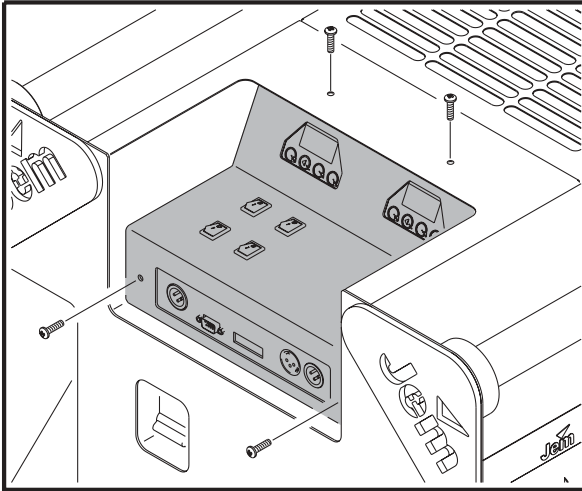
If the fuse blows repeatedly, there is a fault with the unit that requires service by a Martin technician.

Never bypass the fuse or replace it with one of another size or rating. Installing any other fuse may damage the device!

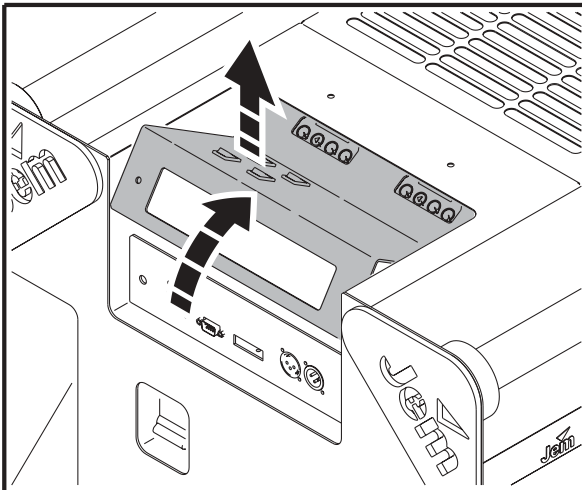
**Warning!** Always disconnect the device from AC power before installing the fuse.

## Replacing a fuse

- 1 Disconnect the fixture from mains power.
- 2 Remove the four access screws from the control panel.

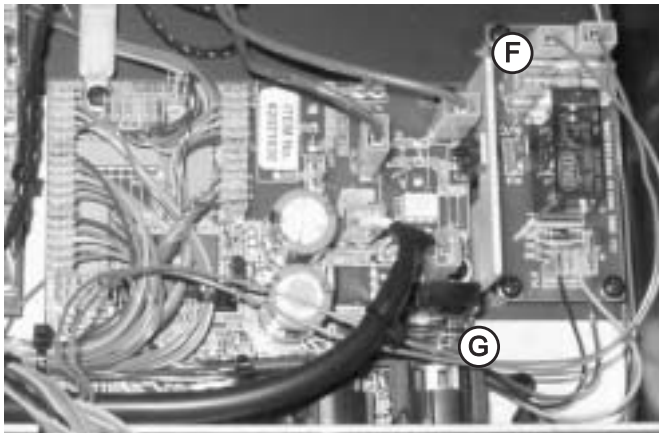
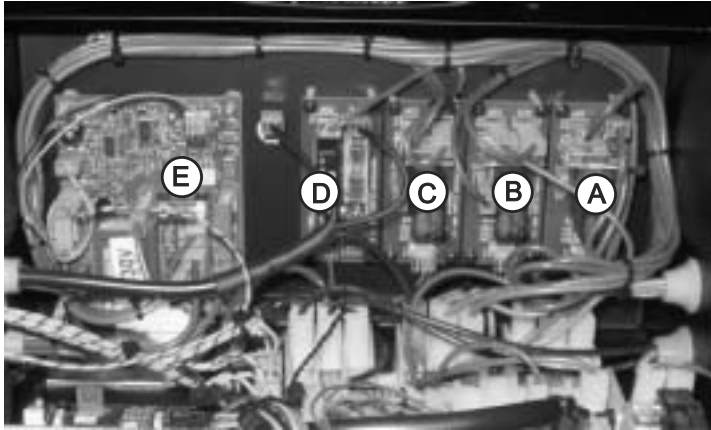


- 3 Lift the control panel off.





4 The fuses can be found on the circuit boards.



5 Remove the fuse and replace the fuse with one of the same type.

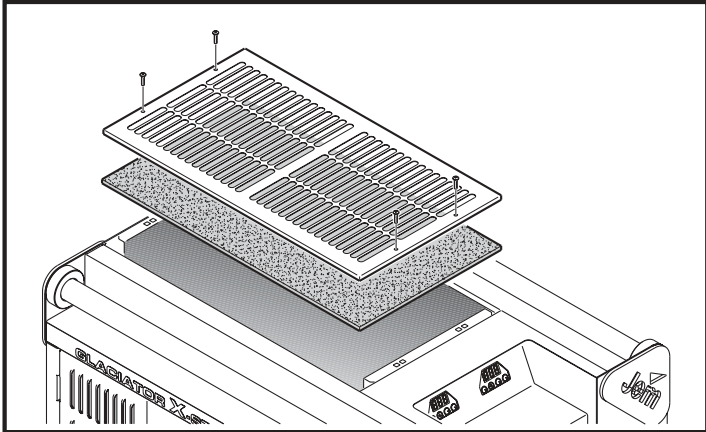
|          |                          |        |
|----------|--------------------------|--------|
| <b>A</b> | Compressor control relay | 3.15AT |
| <b>B</b> | Condenser fan relay      | 3.15AT |
| <b>C</b> | Local/Remote relay       | 3.15AT |
| <b>D</b> | Solid state relay        | 3.15AT |
| <b>E</b> | Power PCB                | 15AT   |
| <b>F</b> | External pump signal     | 1AT    |
| <b>G</b> | DMX receiver low voltage | 2AT    |

6 Replace the device cover and tighten the access screws, taking care not to trap any loose wires.

## FILTER REPLACEMENT

---

The Heavy Fog Glaciator uses a washable synthetic fiber filter in the air intake for the condenser unit (located at the top of the machine). This can be removed for cleaning by removing the ventilation grill above it (four M5 screws).



Use the following guidelines for when to check the filter. Under

- Normal conditions (clean and dry environment), inspect and clean/replace the filter every 250 hours
- Severe conditions (dirty and/or damp environment), inspect and clean/replace the filter every 150 hours

## FIRMWARE UPDATES

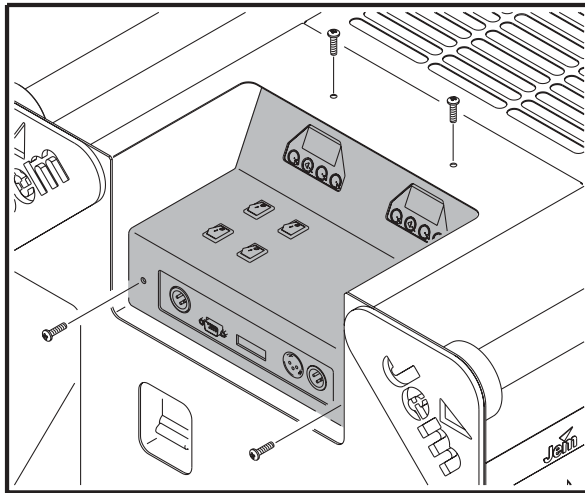
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The factory installed firmware version is indicated on the serial number label.

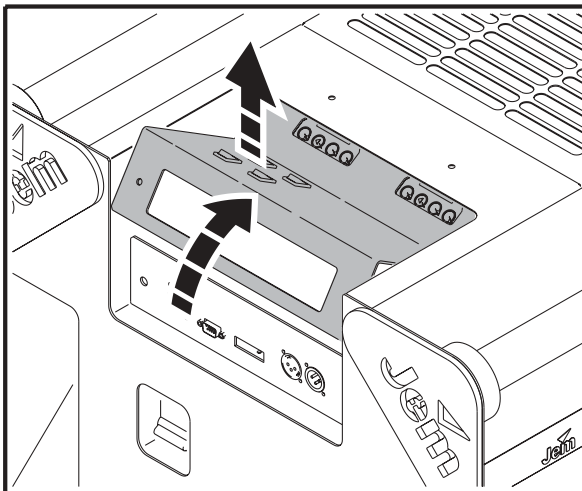
Firmware is installed using a Martin AVR Uploader and a PC. To install the firmware update:

- 1 Prepare the AVR Uploader as described in its user manual.
- 2 Disconnect the fixture from mains power.

3 Remove the four access screws from the control panel.

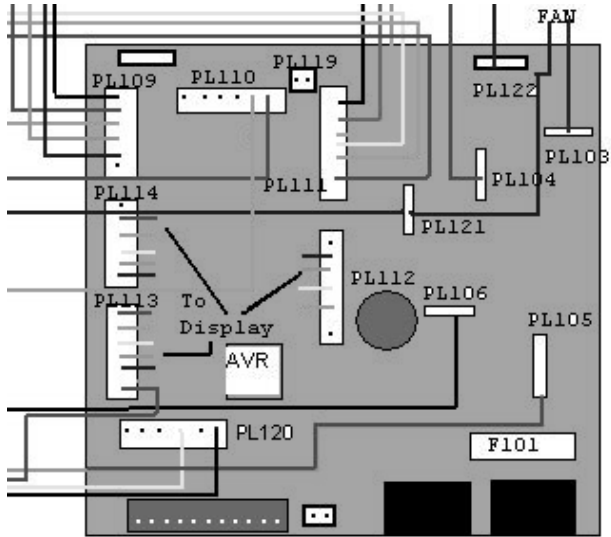


4 Lift the control panel off.



5 Locate the DMX printed circuit board (PCB) just behind the DMX input and output sockets.

- 6 On the DMX PCB locate the AVR upload socket. Its position is indicated on the following illustration.



- 7 Connect the uploader to the AVR Upload socket on the control panel, and apply power to the fixture. See the AVR user manual for more information on performing the upload.
- 8 When the upload is complete, disconnect the AVR Uploader, replace the device cover and tighten the access screws, taking care not to trap any loose wires.

# TROUBLESHOOTING

| <b>Problem</b>  | <b>Probable cause(s)</b>                      | <b>Suggested remedy</b>                      |
|---|---|--|
| No fog output when the machine is fired using the Fog or Timer switch | Machine is not ready                          | Allow time to reheat                         |
|   | Fluid is below min level                      | Add fluid                                    |
|   | Standby switch is OFF                         | Set Standby to ON                            |
|   | Timer on-period (ton) is set to 0 seconds     | Set ton to at least 1 second                 |
| No fog output when using DMX to fire the machine                      | Incorrect DMX address                         | Check settings                               |
|   | Machine is not ready                          | Allow time with DMX on                       |
|   | No DMX termination                            | Fit 120 Ohm resistor                         |
| Flu/Lo is displayed on the Fog display                                | Fluid level is below minimum                  | Add more fluid                               |
| Machine is not ready after 20 minutes heating time                    | Standby switch is OFF                         | Set Standby to ON                            |
|   | Blown fuse on Power control PCB               | Disconnect supply and replace fuse           |
| Fog disperses too quickly   | Wrong grade of fluid used for the application | Choose a longer lasting fluid                |
|   | Density level too low                         | Increase density setting (reduces fan speed) |
| Fuse blows repeatedly   | Electrical malfunction                        | Refer to service technician                  |

# SPECIFICATIONS

## Physical

Size with casters (L x W x H) . . . 866x638x744 mm (34.1x25.1x29.3 in.)

Size without casters (L x W x H) . . 866x638x600 mm (34.1x25.1x23.6 in.)

Weight (without fluid) . . . . .110 kg (242 lb)

Weight (with fluid) . . . . .115 kg (253 lb)

## Heat exchanger

3.5KW heater (at 240V)

Wide bore steel vaporizing coil

Ceramic thermal trip for over-temperature protection

Electronic Temperature control using thermocouple

## Fluid system

Oscillating piston high pressure fluid pump

Low fluid detection by electronic sensor

On-board fluid capacity . . . . .5L (1.3 US gallons.)

Maximum fluid consumption . . . . . 120mL/minute

## Control panel

2 x LED displays with 4 button keypad

Output level control . . . . . 0 - 20 (0 -100%) for Fog

Timer range . . . . . Delay time (toF) 0 - 90 seconds

. . . . . Run time (ton) 0 - 90 seconds

## Refrigeration unit

Compressor with PWM electronic control . . . . . 0.75 kW (1hp)

Refrigerant . . . . . R404A (1.2 Kg)

## Output connection

Ducting adaptor to accept 150mm (6") flexible ducting

## Remote control options

DMX-512 controller

PLC interface for simple switching control of the system

## **DMX**

Required Channels . . . . . 2  
Output is proportional for all levels above 12%  
Channels supported. . . . . 1 to 511  
Valid start codes. . . . . 0 (dimmer data only)  
Full framing error detection implemented

## **Power requirements (230V / 50Hz model)**

Input voltage . . . . . 230V / 50Hz single phase (32A supply)  
Maximum input power . . . . . 4.893kW @ 230V  
Maximum current. . . . . 22.2A

## **Power requirements (208V / 60Hz model)**

Input voltage . . . . . 208V / 60Hz single phase (32A supply)  
Input power (max) . . . . . 4.325kW @ 208V  
Current (max). . . . . 21.9A

## **Accessories**

XLR termination plug . . . . . P/N 91613017  
Filter. . . . . P/N 56210020  
Remote control . . . . . *contact your Jem or Martin dealer*

## **Ordering information**

Jem Glaciator X-stream, 230V / 50Hz . . . . . P/N 92210500  
Jem Glaciator X-stream, 208V / 60Hz . . . . . P/N 92210501



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