

PROJECT TITLE	Jem DUAL
PROJECT GROUP	MSc04-ID11 Camilla Dahl Hansen Thue Kristensen
PROJECT PERIOD	03.02.2014- 28.05.2014
PARTNERS	Martin Professional ApS Martin Manufacturing UK
MAIN SUPERVISOR	Finn Kehlet Schou Department of Architecture, Design and Media Technology
TECHNICAL SUPERVISOR	Benny Ørtoft Endelt Department of Production
NUMBER OF PAGES	20
COPIES	7



Camilla Dahl Hansen



Thue Kristensen

# Jem *DUAL*







The Jem DUAL is a one-of-a kind fog and haze installation system package with a ground based fluid supply that keeps the party going all night long. The split system allows fog- and haze heads to be installed on the floor as well as high up in the truss with convenient fluid refill for all attached smoke heads. As the only product on the market the Jem DUAL offers a unique custom-formula fluid that produces high density fog as well as a uniform and optically transparent haze to enhance every light effect. The new revolutionary Jem touch screen remote control offers intuitive control of every functionality.



# Jem *DUAL*



## ***Jem DUAL Base Unit***

The Jem DUAL base unit offers convenient filling of smoke fluid for all attached heads. The base unit can be positioned in a convenient location such as the DJ booth or behind the stage which guaranties no more inconvenient high truss refills.

- 10 liter fluid capacity keeps the system going all night long - for several nights
- The base houses a multi-purpose haze- and fog fluid to suit every nightclubs need



# CONVENIENCE IS KEY



## ***Jem DUAL Fog Head***

The compact special club-designed fog head has a rapid heat up time and creates continuous adjustable output dense white fast dissipating fog effects.

- The compact head with a massive heat exchanger delivers precise fog from subtle to massive white dispersion
- Reliable and powerful to suit every application from small bars to larger nightclubs
- Designed for both truss- and floor positioning



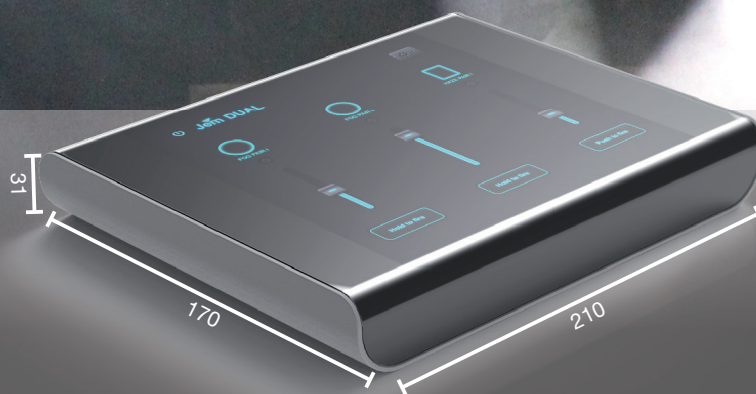
## ***Jem DUAL Haze Head***

The compact high performance haze head delivers exceptional atmospheric haze with a long hang time. Low noise design and output level control makes it suitable for a large variety of applications.

- The haze head offers texture free, homogeneous haze to enhance every light effect
- Precise output control to suit the need of every application
- Designed for both truss- and floor positioning



# Jem *DUAL*



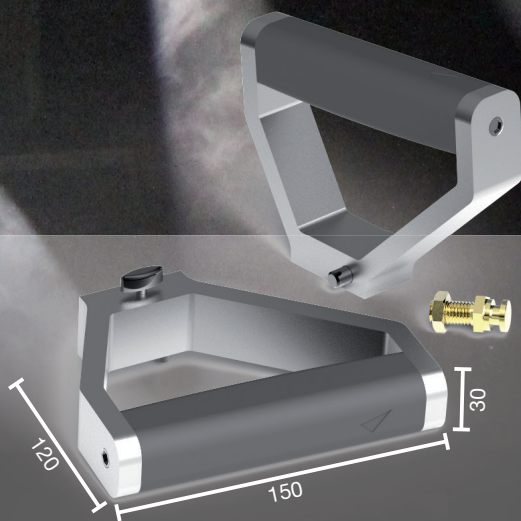
## *Jem DUAL Remote Control*

The new revolutionary touch screen Jem Remote Control offers intuitive control of every attached smoke effect – from massive dense fog to subtle haze. Accessible output adjustment for each pair of heads as well as user-selectable timer functionality.

- Plug-and-play functionality for every DJ
- Designed for club DJ's with every required functionality at the fingertips



# ***THE COMPLETE SOLUTION***



## ***Martin Omega Handle***

**Durable and easy to attach. The Martin Omega Handle makes positioning of the smoke heads a piece of cake. The spigot connector attaches to the Omega bracket instantly and angle adjustment is done in seconds.**

- Designed for the Martin Omega bracket to suit a large variety of smoke and lighting products
- Tough and durable design to last for years
- Easy snap spigot connector



## ***Martin Cable Fastener***

**No more patch up solutions when organizing the cable mess high up in the truss. The Martin cable clip organizes the cables and fluid lines in seconds and makes troubleshooting and servicing easier than ever.**

- Made of strong and flexible polymer, making it last show after show
- Easy to attach and detach – no need for tools
- Holds six cables and fluid lines of varies size







A high-angle, low-perspective shot of a nightclub interior. A large, multi-tiered crowd of people is visible, with many looking up towards the center. A large, reflective disco ball hangs from the ceiling, casting colorful light patterns. A person is suspended in the air, holding a long, flowing white ribbon that trails down towards the crowd. The scene is filled with bright, colorful stage lights (green, blue, purple) and a thick layer of white smoke or fog, creating a dynamic and energetic atmosphere. The overall composition is tilted slightly to the right.

# Jem **DUAL**

THE COMPLETE SMOKE SYSTEM FOR EVERY CLUB



# Jem *DUAL*

The Home Screen offers all primary functions right at the fingertips and can be customized to suit every need – no matter which devices are connected. There are fog timer presets and the output can be adjusted with a simple swipe for each attached pair of fog or haze heads.



The Remote Controller supports RDM device feedback which notifies the user about possible system malfunctions or if the system runs out of fluid. Furthermore it signals when the smoke heads are heating and ready to use.



## *Jem DUAL Remote Control*

The unique Jem DUAL Remote Control is the potential future controller for the entire Jem product range. Small in size and with endless possibilities due to its touch screen which is able to be programmed to every imaginable scenario.

- Easy-to-read high contrast touch screen
- Rotatable screen to suit every potential scenario
- One-way connectors to minimize cable clutter



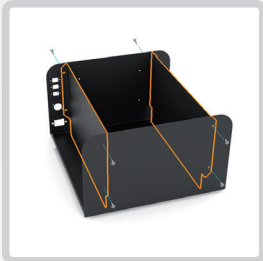
# ***PLUG-AND-PLAY FUNCTIONALITY AT YOUR FINGERTIPS***



- XLR 3-pin connection for DMX w. RDM to control the entire Jem DUAL system with one cable
- Plug-and-play with endless possibilities
- Small in size – large in impact
- High friction bottom to keep the device steady in the DJ booth
- Rounded edges to compliment the Jem DUAL design
- Designed to fit the colour scheme of the whole Jem range

# Jem *DUAL* ASSEMBLY

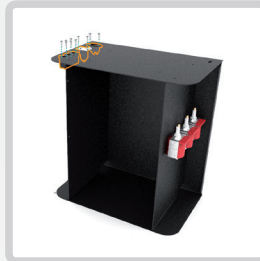
## Base Unit



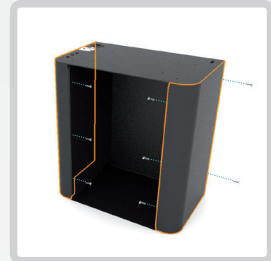
The back panel is layed back down and the side panels are screwed on from each side.



The three fluid pumps are screwed on the right side panel and the PCB's on the left side panel. Both screwed on from the inside.

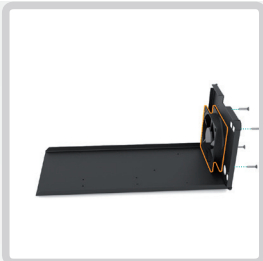


The connectors are screwed on the top of the back panel. The wiring loom and fluid lines are connected.



The side faceplates are screwed onto the back panel and the side panels.

## Haze head



The Sunon fan is screwed onto the back of the bottom sheet with four screws.



The bottom sheet is turned to upright position and the air duct is screwed onto the bottom sheet.



The two heat exchanger brackets is screwed onto the heat exchanger, and the brackets are screwed onto the bottom sheet.



The solenoid valve is screwed onto the bottom sheet and the middle plate is riveted onto the bottom sheet.

## Fog head



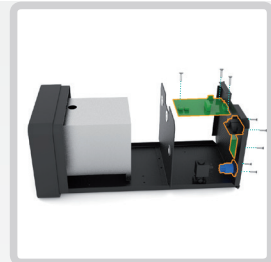
The heat exchanger and the solenoid valve are screwed onto the bottom sheet.



The middle plate is riveted onto the bottom sheet.



The front piece with the fog nozzle trim attached is screwed onto the bottom sheet.

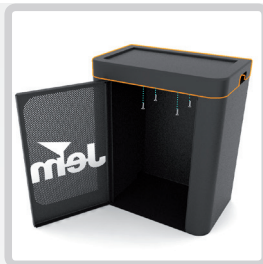


The PCB's with mounting pins and connectors are screwed onto the back of the bottom sheet. The wiring loom is connected.





The door is screwed to a hinge on the left side and closed with two magnet locks on the right side.



The top cover is screwed into place with four screws in the top-inside of the back panel.



The front piece with the haze nozzle trim attached is screwed onto the bottom sheet.



The PCB's and the connectors are screwed onto the back of the bottom sheet. The wiring loom is connected.



The top cover slides on from the back and is screwed onto the back end of the bottom sheet.



The top cover is screwed onto the bottom sheet from the bottom.



The top cover slides on from the back and is screwed onto the back end of the bottom sheet.



The top cover is screwed onto the bottom sheet from the bottom.



# Jem *DUAL* BENCHMARKING



## *Jem DUAL*

## *Martin Club Smoke*

### Dimensions

Base:	450 x 380 x 230 (HxWxD) 11 kg - 0.039 m³
Fog head:	180 x 220 x 440 (HxWxD) 14 kg - 0.017 m³
Haze head:	180 x 220 x 440 (HxWxD) 11 kg - 0.017 m³

Mounting:	Floor and truss
Fluid lifting height:	10 m

Fluid capacity:	10 l
Fluid retail price (10 l):	42.39 £ (Jem DUAL fluid)

Max. attached heads:	6 (Combination of haze and fog heads)
----------------------	---------------------------------------

Max. system fog output:	3480 m³ per minute (6 heads)
Max. system haze output:	15000 m³ per minute
Warm up time (approx.):	6 - 9 minutes (Fog and haze)
Max. fluid consumption (4 fog heads):	280 ml per minute - 35 hour run time
Fluid efficiency (fog):	8.3 m³ per ml fluid

### Suggested retail price/Markup

System w. Base and 4 fog heads:	3440 £ / 412 %
---------------------------------	----------------

### Control

Control protocol:	DMX w. RDM (feedback functionality)
-------------------	-------------------------------------

480 x 410 x 290 (HxWxD) 12 kg - 0.057 m³
165 x 310 x 330 (HxWxD) 10 kg - 0.017 m³
-

Floor and truss
2 m

10 l
49.23 - 84.50 £ (DJ Mix / i-fog)

4 (Supports fog heads only)
-----------------------------

2000 m³ per minute (4 heads)
-
7 minutes (Fog only)
400 ml per minute - 25 hour run time
5 m³ per ml fluid

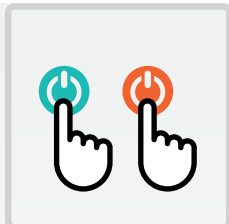
3415 £ / 400 %
----------------

DMX
-----

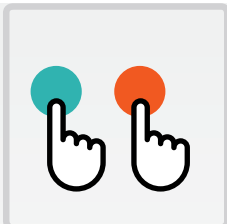


## Typical club setup

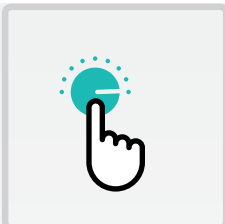
### FOUR INDIVIDUAL FOG MACHINES AND TWO INDIVIDUAL HAZE MACHINES



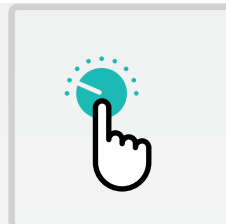
The DJ turn on at least two different remotes - for fog and for haze.



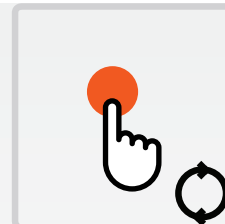
The DJ checks to see if the fog machines and the haze machines work using at least two different remotes.



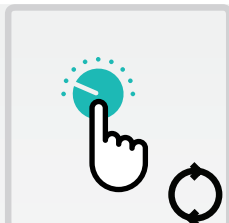
The DJ turns on the haze at a 100% to fill up the room with haze.



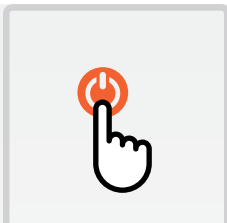
The DJ turns down the haze to 20% to maintain the haze level in the club, using the haze remote(s).



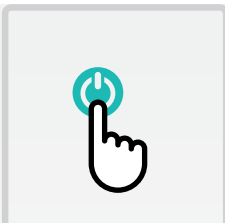
The DJ fires fog for an effect using the fog remote(s).



The DJ adjusts the haze level to fit the club conditions using the haze remote(s).



The DJ turns off the haze machines using at least one remote.



The DJ turns off the fog machines using at least one remote.



The DJ, busboy or technician refills the fog fluid in the fog machines.



The DJ, busboy or technician refills the haze fluid in the haze machines.

## Martin Club Smoke setup

### THE FOUR-HEAD CLUB SMOKE SYSTEM AND TWO INDIVIDUAL HAZE MACHINES



The DJ, busboy or technician refills the fog fluid in the fog machines in a convenient place.



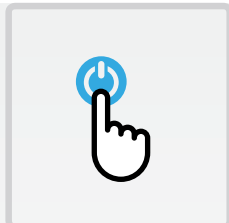
The DJ, busboy or technician refills the haze fluid in the haze machines.

The Club Smoke only improves the fog fluid refilling situation compared to a typical club setup and is able to control all fog machines at once. All haze functionality is left untouched compared to the typical club scenario using individual fog- and haze machines.

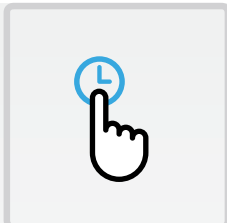
The Jem DUAL simplifies the entire scenario. The use scenario for the DJ is intuitive and simple using one remote control for both fog and haze. The haze can be programmed to have a "Fill Room" function that suits the club perfectly. Furthermore, the refilling situation is as simple and easy as possible with one type of fluid for all smoke functionality that can be refilled in one convenient location.

## Jem DUAL setup

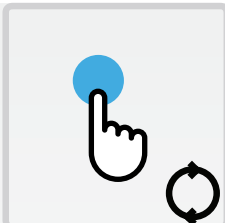
### ONE JEM DUAL BASE UNIT WITH FOUR FOG HEADS AND TWO HAZE HEADS



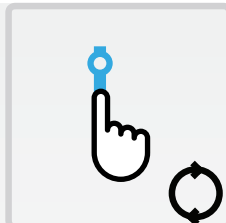
The DJ turns on the Jem DUAL System using the Remote Control.



The DJ presses the "Fill Room" function and the room is filled with haze and turn down automatically.



The DJ fires fog for an effect using the Remote Control.



The DJ adjusts the haze level to fit the club conditions using the Remote Control.



The DJ, busboy or technician refills the Jem DUAL system with one type of fluid in a convenient place.



## PRODUCTION COSTS

Martin operates with a mark-up of 400% based on the total production costs. The mark-up is lowered on the Jem Dual base unit to provide a cheaper system start-up. This cost is translated into a higher mark-up on the fog- and haze heads.

	Base unit	Fog head	Haze head
Material:	172.5 €	95 €	131 €
Assembly:	40 €	20 €	30 €
Total:	<u>212.5 €</u>	<u>115 €</u>	<u>161 €</u>
Sales price:	760 €	670 €	860 €
Mark-up:	258%	483%	434%
Gross profit:	<u>547.5 €</u>	<u>555 €</u>	<u>699 €</u>

## DEVELOPMENT COSTS

The total development costs are low due to the Jem DUAL system using a large amount of stock parts that are thoroughly tested in the products they are currently used in. The tooling can be done relatively cheap as the Jem DUAL targets a niche market, why the moulds that are needed can be done in cheaper material because of the low production output.

The Marketing budget is based on digital presentation material and the Sales staff training is training in the Jem DUAL features and core selling points.

PCB, software and tooling:	13.000 €
MMUK factory employee training:	5.500 €
Field testing:	18.000 €
Marketing:	13.000 €
Sales staff training:	7.000 €
Total:	<u>56.500 €</u>

## SYSTEM CALCULATION

A system is defined as a base unit with a pair of fog heads and a pair of haze heads. This system size can be scaled down or up to accommodate scenarios of various sizes.

The increased production costs are due to the new definition of a system containing a pair of haze heads which have a higher production price than a fog head. A Jem DUAL system with four fog heads have similar price as Club Smoke - as seen in the benchmarking on page 14. The Club Smoke system do not support haze functionality.

	Jem Dual	Club Smoke
Production costs:	764.5 €	683 €
Sales price:	3820 €	3415 €
Mark-up:	<u>400%</u>	<u>400%</u>
Gross profit:	<u>3.055.50 €</u>	<u>2732 €</u>



The current Martin Club Smoke sells approximately 60 systems a year. It is estimated that the sales numbers of Jem Dual can double the current Martin Club Smoke sales numbers in year 2 to reach a steady sale of 120 systems a year [Appendix K and Y].

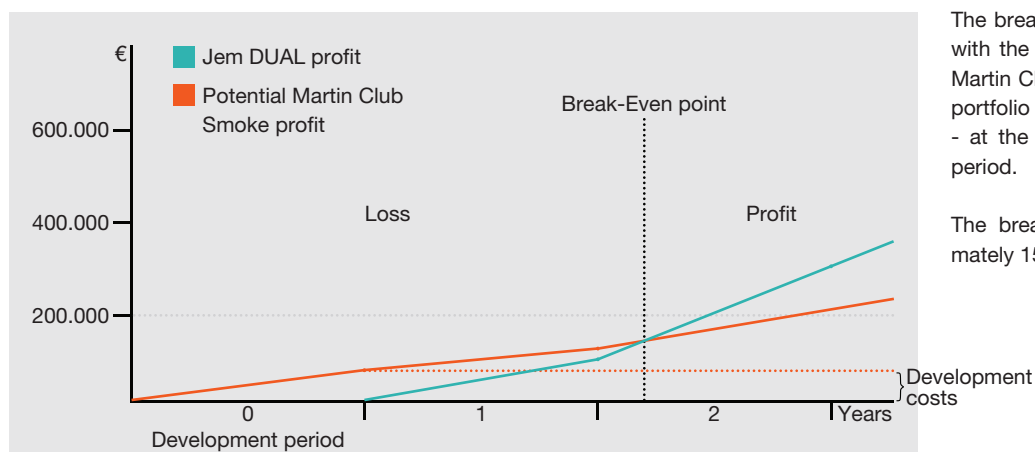
## YEAR 1

	Quantity	System sales price	Total sales price	Total production costs	Total revenue
Jem Dual	90	3820 €	343.800 €	68.805 €	274.995 €
Club Smoke	60	3415 €	204.900 €	40.980 €	163.920 €
Effective profit					<u>111.075 €</u>

## YEAR 2

	Quantity	System sales price	Total sales price	Total production costs	Total revenue
Dual Smoke	120	3820 €	458.000 €	91.740 €	366.260 €
Club Smoke	60	3415 €	204.900 €	40.980 €	163.920 €
Effective profit					<u>202.340 €</u>

## BREAK-EVEN

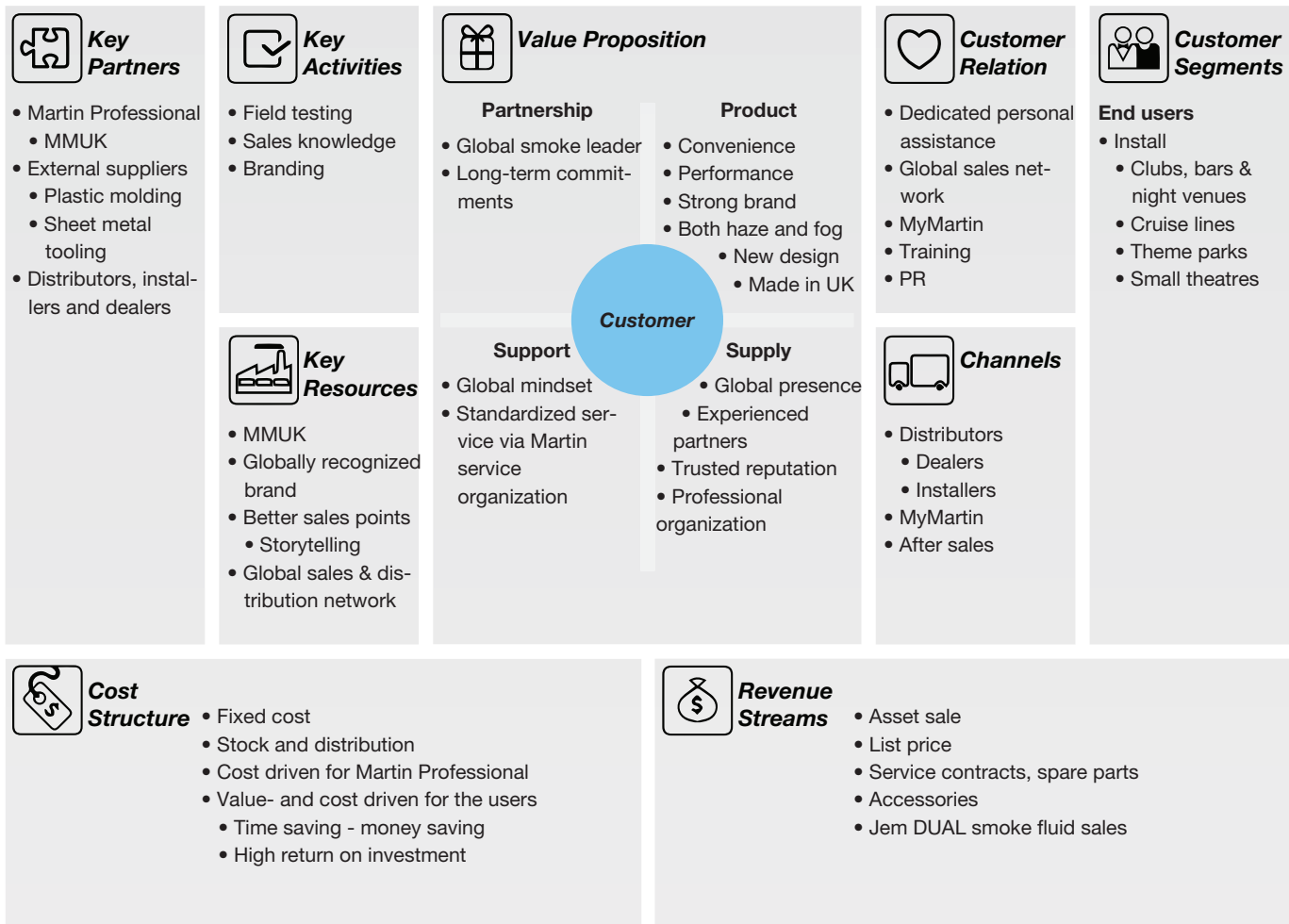


The break-even time is calculated with the Jem DUAL replacing the Martin Club Smoke in the product portfolio by the end of year zero - at the end of the development period.

The break-even time is approximately 15 months.



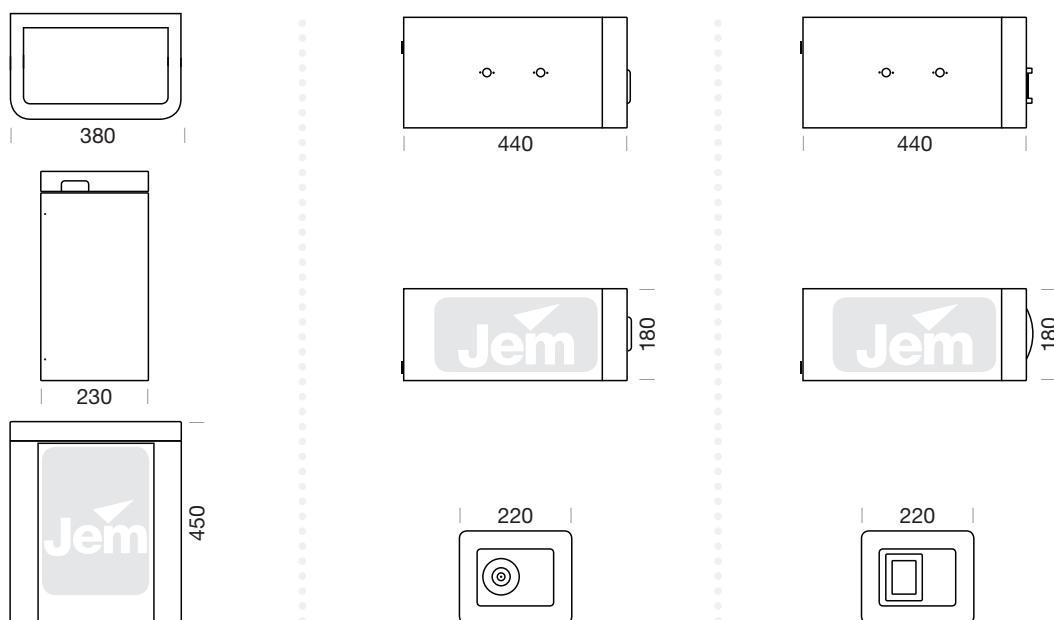
# Jem **DUAL** BUSINESS PROPOSAL



It is important that Martin Manufacturing UK can ship the Jem DUAL as well as spare parts fast. This is ensured by using a large amount of stock parts to make sure parts are always in stock. This also applies for the new Jem DUAL smoke fluid. Being a single part number with only one type of fluid in one type of fluid container will keep stock items to a minimum.

The value propositions take advantage of the brand value of Martin and Jem, being of high quality in the eyes of the users. Furthermore the product serves as an all-in-one smoke system, with both fog and haze as the only product on the market. This will add value to the already strong Jem brand. The new design differentiates the product from the competitors and the global support and standardized service via Martin service organizations adds value in the long run with a possible high return on investment as long as the quality of the production is kept high.

# Jem *DUAL* SPECIFICATIONS



## Base Unit

### Installation

Orientation: Floor or wall mount

### Performance

Fluid pumps: Oscillating piston, high pressure X3  
 Fluid lifting height: 10 meter  
 Fluid capacity: 10 l  
 Max. attached heads: 6.  
 (Combination of haze and fog in pairs)

### Construction

Housing: Steel and ABS plastic  
 Dry weight: 11 kg

### Connections

Power connection: 3-pin IEC male socket  
 Remote control: 3-pin locking XLR  
 DMX data: 3-pin locking XLR

### Electrical

AC power: 220-240 V nominal, 50 Hz  
 Main fuse: 3.15 AT (slow blow)  
 230 V, 50 Hz: 918 W, 5.85 A

### Thermal

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

## Fog head

### Installation

Orientation: Floor or in truss mount

### Performance

Heat exchanger: 1150 W, direct thermal protection  
 Max. fog output (approx.): : 580 m³/min.  
 Warm-up time (approx.): 9 min.  
 Max. fluid consumption: 70 ml/min

### Construction

Housing: Steel and ABS plastic  
 Dry weight: 14 kg

### Connections

Power connection: PowerCon male socket  
 Remote control: RJ-45 to base

### Electrical

AC power: 220-240 V nominal, 50 Hz  
 Main fuse: 6.3 AT (slow blow)  
 230 V, 50 Hz: 1190 W, 5.2 A

### Thermal

Maximum ambient temperature (Ta max.): 40° C (104° F)  
 Exterior surface temperature, steady state: 50° C (122° F)  
 Max. nozzle temperature: 200° C (392° F)

## Haze head

### Installation

Orientation: Floor or in truss mount

### Performance

Heat exchanger: 900 W, direct thermal protection  
 Coverage volume (approx.): : 2500 m³/min.  
 Warm-up time (approx.): 6 - 8 min.  
 Max. fluid consumption: 10.5 ml/min

### Construction

Housing: Steel and ABS plastic  
 Dry weight: 11 kg

### Connections

Power connection: PowerCon male socket  
 Remote control: RJ-45 to base

### Electrical

AC power: 220-240 V nominal, 50 Hz  
 Main fuse: 6.3 AT (slow blow)  
 230 V, 50 Hz: 1190 W, 4.13 A

### Thermal

Maximum ambient temperature (Ta max.): 40° C (104° F)  
 Exterior surface temperature, steady state: 50° C (122° F)  
 Max. nozzle temperature: 200° C (392° F)



