The Martin smartMAC

By: Mike Wood

Fig.1: Unit as tested.

Fig.2: Lamp

Fig.3: Lamp change.

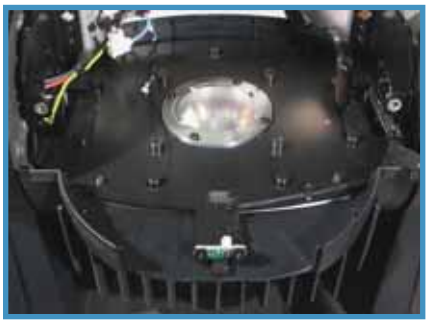

Fig.4: Heat shield diffuser.

We try to cover as broad a range of products as we can in these reviews. We've discussed a number of the largest 1,200W units from various manufacturers over the years, but this month we are going to the opposite end of the spectrum and looking at one of the smallest—the Martin smartMAC.

Martin is well-known for its highly successful range of MAC-branded automated luminaires, and the smartMAC joins a product line that's broad-reaching. Introduced at the end of 2007, Martin appears to be aiming the smartMAC primarily at the bar, lounge, and restaurant market, although its size may make it attractive to other users. Being a small unit with a 150W lamp, the feature set is obviously more limited than its larger brothers and sisters, and it must be judged with that consideration in the back of one's mind. Having said all that, how does it measure up?

Whether discussing large or small units, these reviews always follow the same format. I examine the single sample of the product that's been supplied to me by the manufacturer and measure every parameter on that unit as accurately as I can. These measurements are provided to you without embellishment, so that you have the information to draw your own conclusions. As always, let's start at the lamp and work forward through the smartMAC, ending up at the output lens.

The smartMAC (Fig.1) is fitted with selectable voltage power supplies, and will run on the standard worldwide voltages of 100-120V or 200-240V 50/60Hz. For these tests, it was set on the 120V 60Hz setting, supplied with a nominal 118V 60Hz and consumed 2.13A for 209W of power at a 0.83 power factor.

The lamp

The lamp is the newest and smallest in the MSD range from Philips—the MSD 150/2 (Fig. 2). The MSD lamps are often seen as long-life versions of MSR lamps and, although similar to MSR lamps, use a slightly different chemistry to get their 3,000-hour rated life. The "/2" designation usually indicates a higher-color-temperature lamp, with a corresponding reduction in CRI. That is the case here; the MSD 150/2 is rated at a high 8,500K with a CRI of 65, which matched my measurement of 8,400K very well. A CRI of 65 is fairly low, but likely will be fine for the intended use. The high color temperature makes the output appear fairly blue, but also gives the perception of a brighter unit. The MSD250/2, from the same range of lamps, is in common use by many manufacturers and shares the same traits. If you need even longer lamp life and don't mind giving up some output, then you can use the 9,000-hour CDM 150 lamp instead.

The MSD 150/2 is a conventional, single-ended, jacketed discharge lamp with an axial arc gap and uses a standard two-pin lamp base. Changing the lamp is simple and familiar, and is accessed by removing two screws at the rear of the unit (Fig. 3). Note that you'll need a set of Torx drivers to work on this unit; although the manual says these are thumbscrews, they are, in fact, like many fasteners on the smartMAC, Torx head machine screws. Although many of the screws on the unit are captive, these aren't—so take care not to drop them. The rear plate, complete with the lamp-adjustment mechanism and the lampholder, is removed as a single assembly. The lamp is then easily exchanged and the assembly replaced into the unit. Lamp adjustment includes the usual three screws for setting the lamp alignment. Next in the optical path is an elliptical reflector, followed by what looks like a combination heat shield and diffuser (Fig. 4). It's worth mentioning at

this point that one of the selling features Martin touts for the smartMAC is the complete absence of fans and consequent silent operation. With a fairly small 150W to dissipate, the smartMAC manages to keep everything cool with a combination of heatsinks, shielding, and compartmentalization of the various components. In this case, the glass shield/diffuser serves two purposes—it keeps conducted and convected heat out of the main body of the luminaire, and also provides a small amount of diffusion to improve the image flatness and homogeneity. In addition, the rear surface of the plate separating the optical compartment from the lamp compartment has a mirror finish, to reflect back infrared energy that's emitted from the lamp heatsink. This all worked extremely well and, even after running for a few hours, nothing was too hot, and I was even able to change gobos without pain. Martin is trying to get every lumen it can out of this small lamp, so it has gone for a fairly fast ellipsoidal optical system. This often leads to a very peaky beam, and I'm sure that this filter is one of the means it has utilized to combat that and smooth things out a little. Also mounted on the rear of the unit is the high-voltage ignitor connected back to the ballast mounted in the top box.

Color systems

Next is a single color wheel containing eight replaceable trapezoidal dichroic colors plus an open aperture (Fig. 5).

Fixed Color Wheel

Color	Blue	Green	Orange	Yellow	Pink	Magenta	Congo	Red
Transmission	2.6%	36%	42%	84%	28%	6.9%	0.6%	4.5%

Given the market this unit is aimed at, it's not surprising to see such saturated colors. The reds and blues in particular are very deep and definitely chosen for their effect value. It's hard to get a great red with the MSD/2 lamps, as there is so little red energy there to start with; however, the smartMAC does a reasonable job.

The trapezoidal filters have a fairly small join between them, so the smartMAC can produce some pretty good split colors (Fig. 6). The colors are all removable, and use a center retaining clip similar to those used on other Martin products—the access to change them is much easier than usual, though; more on that later in the review.

Fig.5: Effects module.

Color Wheel

Color change speed – adjacent	0.15 sec
Color change speed – worst case	0.5 sec
Maximum wheel spin speed	0.57 sec/rev = 106 rpm
Minimum wheel spin speed	87 sec/rev = 0.69 rpm

The color wheel has the usual select-and-rotate functionality. It's a fairly quick wheel with optional quick-path operation, not the fastest I've seen, but with pretty good snappy changes. It also has a good range of wheel-rotate speeds. As one of its advertised uses is in stand-alone operation for display and retail work, these slow, subtle changes are important.

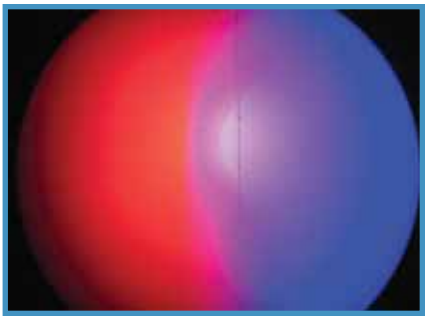

Fig.6: Split colors.

Strobe shutter

The single flag shutter is mounted between the color wheel and the gobo wheel. You can see it clearly at the top of Figure 5. This flag is the smartMAC's only means of reducing the light output, as the fixture has no dimmer. You can slide the shutter across the beam slowly, but that really isn't dimming, as the shutter remains distinctly focused the whole time—it really behaves more like a single framing shutter. Leaving out a dimmer seems like a slightly odd

Fig.7: Gobo.

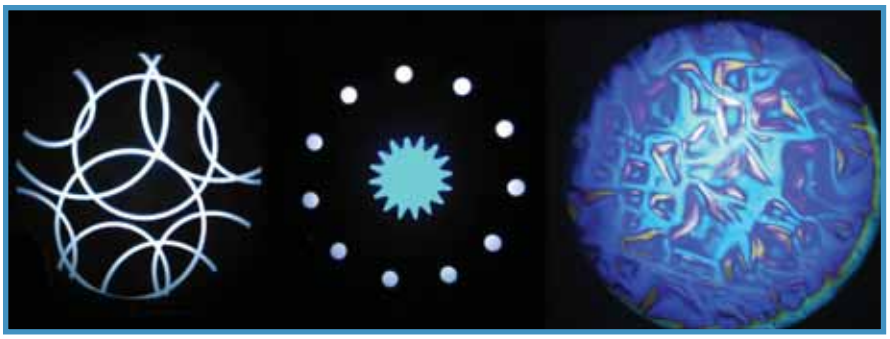

Fig.8: Sample gobos.

Fig.9: Effects access.

Fig.10: Small fingers required

Fig.11: Changing gobo.

retail display, this is a key point. I'm sure Martin made the gobo change so easy to address this market's needs.

Positioning and indexing accuracy on the rotating gobos was good, with a measured hysteresis error of around 0.26°, which is 1.1" at a 20' throw. Rotation and indexing of gobos was also smooth and clean at all speeds, with no evidence of jerkiness or hesitation. The slow-speed gobo rotation was particularly impressive. The wheel spin was a little jerkier, but it didn't worry me too much.

Rotating Gobo

Gobo change time, adjacent apertures	0.3 sec
Gobo change time, max (Gobo 1 to 4)	0.72 sec
Max gobo rotate speed	0.5 sec/rev = 120 rpm
Min gobo rotate speed	508 sec/rev = 0.12 rpm = 7 rph
Max wheel spin speed	0.8 sec/rev = 75 rpm
Min wheel spin speed	840 sec/rev = 0.07 rpm = 4.3 rph

decision to me, but I guess the Martin marketing moguls decided that it wasn't necessary for the target market. As a strobing shutter it works fine, and provides a measured strobe range of 1.2Hz to 8Hz.

(Note: I asked Martin to comment on the lack of a dimmer. The official position on this is that the main design criteria for the smartMAC were high output and wide beam angle, and the optical design to achieve that in the small package precluded a dimmer. Martin determined that a dimmer provided less value for the smartMAC's core applications and would not generate sufficient benefits to justify the additional price to the customer.)

Gobos

Next in line is the rotating gobo wheel. The smartMAC wheel has six replaceable rotating gobos plus the open aperture. Every gobo assembly slides out easily for replacement (Fig. 7), and each of the gobos has its own sensor magnet so that it can be aligned for indexing—you can see the magnet as the small square at the bottom of Figure 7. The unit comes as standard with a mix of metal and glass gobos, so is clearly capable of taking custom designs in either material (Fig. 8). Again, with one of the uses being

One attribute that I found slightly different from other moving lights was the very large gap between gobos that was noticeable when rotating the wheel slowly. One gobo almost completely disappears, leaving a black screen before the next rises into view. You can see when doing this that the actual projected beam width is about twice that of the open aperture, so there's quite a lot of vignetting going on. I'm not sure if this is deliberate on Martin's part—so that it behaves a little like a slide projector—or whether it's just a function of the engineering decisions on wheel sizes. The novel access to the gobo and color-change system pretty much requires that the two wheels are of equal size, so that constraint may have driven this design. I also noticed some focus difference between gobos—this is undoubtedly driven by the mix of materials, with metal gobos focusing differently from glass ones. It's not a big deal, as the smartMAC has remote focus capability, but one should take care when programming.

Now is perhaps a good time to talk

Fig.12: System overview.

about gobo and color replacement. Martin has done a very neat job here by providing a tool-free access hatch. Figure 9 shows you what happens: Lift a small flap on the side of the unit and you get direct access to both wheels. There is a sensor to tell if the hatch has been opened and, if the unit is powered up when you open it, movement will stop so you don't have to chase them round. Even neater, you can use the flap sensor as a control—closing and opening the flap quickly causes the unit to increment through the gobos and colors so, by flapping it up and down a few times, you can get the gobo or color you want to change lined up with the access point. After you've changed out the gobo or color, close the hatch again and the unit will re-home those two wheels. It's a very elegant system.

Figure 10 shows you the view into the hatch—the gobos are easily accessed and removed, as can be seen in Figure 11; however, the gap to get your fingers in to grasp the colors is pretty small and, in the user manual, Martin suggests using a padded pair of pliers to grab them.

If you need more unrestricted access for gobo change or cleaning, then the front cover is easily removed by unlocking four quarter-turn fasteners and sliding it off. This reveals the whole system in its glory, as shown in Figure 12.

Lenses and output

The smartMAC has a pretty simple optical system—a single fixed focal length lens group with one motor to move it back and forth to provide focus

Fig.13: Lens.

control. End-to-end movement for this focus motor was 3.4 seconds (Fig. 13).

Measured output using the open aperture was 2,700 lumens, with a field angle of 24.6° (Fig. 14). As mentioned earlier, the output was a little peaky but perfectly acceptable. The center-beam focus quality was excellent, with almost no color fringing or other noticeable aberrations. The only slight flaw I noted was some slight center/edge-focus difference, but this is not at all unexpected for a single group system with such a large (relatively speaking) light source. The output could probably be tweaked a little higher by adjusting the lamp carefully—however, I always try and measure the units "as shipped," to reflect what most users will see in the field.

You can also fit an optional diffuser to the front of the smartMAC to turn it into a wash light. Figure 15 shows the standard front cover on the left and one fitted with the diffuser on the right.

Pan and tilt

The smartMAC has a measured pan and tilt range of 600° and 260°, respectively. Movement speed was good, with a full range pan move taking five seconds, and a more typical 180° move 2.8 seconds. For tilt, the figures were 3.3 seconds for the full range and 2.6 seconds for 180°.

Movement on both pan and tilt was extremely smooth, and the slow speed movement was some of the best I've seen, with no visible glitches even when doing an ultra-slow 15-minute move—that lightweight unit helps here, I'm sure. Martin has also done a good job with hysteresis with positional repeatability accuracy for both pan and tilt at 0.09° or around 0.35" at a 20' throw. Settling bounce and wobble is also minimal and very acceptable.

Noise

With no cooling fans, this is where the smartMAC excels. To the accuracy of my measuring instruments (35dbA), the unit was essentially silent when stationary. I could just hear a slight hum from the power supplies, but it was below the threshold of my meter. You'd need an anechoic chamber and a very good sound meter to measure this unit!

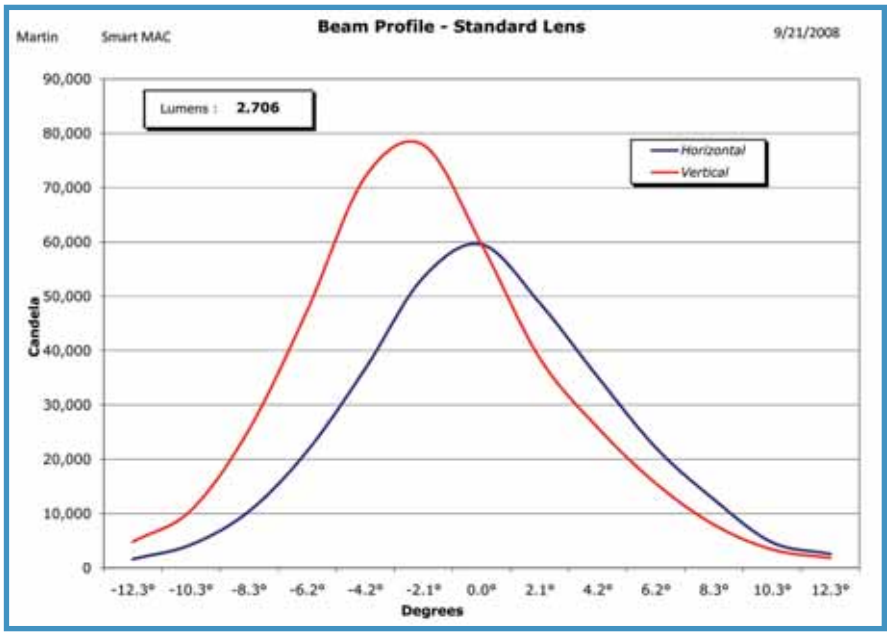

Fig. 14: Output.

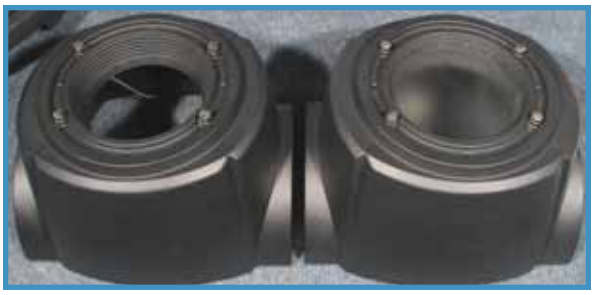

Fig.15: Optional diffuser.

Fig.17: Top box.

Fig.18: Display.

Fig.16: Yoke arm.

In operation, you obviously get some movement noise but it was all extremely low; apart from the homing/initialization noise, the loudest item was the gobo wheel when indexing/spinning at speed, but even that was only 41dBA at 1m.

Homing/initialization time

The smartMAC took 41 seconds to power up from cold and 38 seconds to do a "warm" reset. It was well-behaved during reset, and kept its shutter closed until everything was in its final programmed position.

Electronics and control

This is an interesting part of the design. The absence of fans meant that anything heat-sensitive has to be kept well away from any potential heat sources. That means keeping all electronics away from the head, with its lamp, and the top box, with its power supplies. The yoke is the obvious spot and indeed that's where the main board and drivers are located (Fig. 16). The power supplies (switching motor supply and magnetic lamp supply) are both mounted in the top box underneath the yoke with heatsink fins each side (Fig. 17). Access to everything is simple and neat—as long as you still have that Torx driver.

There is the ubiquitous four-character menu display system (Fig. 18), albeit amber rather than red, with a good selection of options and test routines to set up and use the unit. Martin has given the smartMAC a strong set of stand-alone routines and macros, allowing you to program and run simple routines on the unit from this menu panel. Again, I think this reflects the target audience. I had no problems operating or using any of the options.

Construction & serviceability

I've mentioned construction throughout the review—overall, the smartMAC is a very tidy unit that has obviously had a lot of attention paid to aesthetics. The cable handling and removable base mounting plate both show that this is a unit designed to be seen by the public in an architectural situation.

From a service perspective, the construction is familiar and straightforward to follow. I had no difficulty in disassembling (and, more importantly, reassembling) the smartMAC, just from previous experience of automated lights. It should present no problems to an experienced operator.

As I've said before, unfortunately, the format of these reviews doesn't allow testing during long term, so I cannot comment on reliability; however, I had no problems during the time I had the luminaire in my shop.

So, there we have it, the Martin smartMAC—a neat and elegant unit with a slightly limited set of features, but the undoubted plus of silent operation. Is this the light for you? As always, I just present the measurements and you get to decide…

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