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How to choose your studio lights

This article is for people who want to get started in studio photography and who are looking for advice on the type of kit to buy.

There are 3 basic choices, flash, hotlights and cool lights. Flash is the tool of choice for any kind of people photography and we'll come back to it in a moment.

- Hotlights (also known as tungsten lights) are called hotlights because they really are hot. They're just ordinary quartz halogen lights, often around 500 – 800 watts and they can be used for video (which of course needs a continuous light) and for photographing small products. They don't really have enough power for photographing people because, although they *seem* very bright you'll need a very high ISO setting on your camera, and a very slow shutter speed. They are also extremely hot, they can easily cause a fire and they are uncomfortably bright when they're shining in someone's eyes. They are also very 'warm' (orange) in colour and although the colour balance can be adjusted, the colour simply won't mix with daylight or flash.

- Cool Lights are a much better bet because they're fluorescent and don't run hot. Therefore, they don't create such a tangible fire risk and are more comfortable for everyone involved. They are also more or less the same colour as daylight, so can be used if there is daylight in the room, and can be used in conjunction with flash. But, like hotlights, they have very little power compared to flash and so they cause the same problems with high ISO and slow shutter speeds . Some fluorescent lights can be adjusted by switching off one or more of the bulbs, unlike hotlights, but the range of adjustment is pretty limited.

- Flash is the favourite tool for studio photographers because it's far easier to use, has far more power and doesn't have any of the limitations of either hotlights or fluorescent lights.

So, let's talk about flash. There are two basic types, hotshoe flashes and studio flashes.

Hotshoe flashes are the accessory flashguns that fit onto the hotshoe of your camera. Using them on the hotshoe is convenient but the light is always harsh and never flattering, and if you want to get the best from your hotshoe flash then you'll need to use it off-camera, fitted to a stand, and you'll probably want to use several, to get controlled lighting effects. You'll probably want to use them with umbrellas too, to diffuse the light.

Advantages:

1. Cheap – very cheap is you already have a few lying around…
2. Portable – you can carry them around very easily
3. Battery powered – you don't need mains electricity

Disadvantages:

1. They rely on batteries so you'll need to carry a lot of spares
2. Very limited power – about 60 Joules or less
3. No modelling lamps, making it difficult to previsualise the effects
4. Very limited range of accessories, basically umbrellas, although others are also available they are of limited effectiveness with hotshoe flashes
5. Hotshoe flashes always fire at full power. Nearly all of them have electronic circuitry that 'reduces' the power by shutting off the flash early. The effect of this is that, at low power settings, the flash duration is extremely short. That *seems* to be a good thing, but as the length of the flash duration reduces, the colour temperature of the flash increases with it. Differences in colour temperature are just one of the reasons why hotshoe flashes just a quick and dirty substitute for studio flash.
6. Each flash needs to be triggered, usually with a radio trigger. This adds a lot to the cost and also makes it complicated to use and much less reliable than studio flash. 'Dedicated' systems produced by the major camera manufacturers can be used without big spending on radio triggers but the systems themselves are both very expensive and complicated to use.

So, hotshoe flashes can be very useful but they're really best for journalists and other people who need to use flash on the move. Studio lights are much better if you're using them at home or in a studio.

Buying studio lights can be daunting, because there are so many different makes, different models, different specs and different prices – so the rest of this article will help you to understand what's important and what isn't, so that you can make the right choice for you.

Do all studio lights work in the same way?

Yes, pretty much, even though there are different types – mains powered self-contained lights (known as monoblocks), mains powered 'separates' – known as generator) and battery powered.

Mains powered moonlights are the most popular with people just starting out, probably because they're much less expensive than the other choices. Monoblocks contain all of the 'works' within the flash head itself, plug them into the wall and they're ready to go!

Generator lights have a separate powerpack that sits on the floor, and one or more flash heads are plugged in as required.

Battery Powered Generator Lights are useful because they can be used for location shoots where there is no power available, including outdoor use where high power (not available from hotshoe flashes) is needed to overwhelm the daylight.

This battery powered generator can power 2 heads and produces 600 Joules of power (about 10 times as much as a hotshoe flash) and can fire over 1100 flashes from a single battery charge

The controls on portable power packs are basically similar to those on mains units

What do the technical terms actually mean?

You can't make an informed choice unless you can understand the technical terms and the specifications…

Power is expressed in Joules, or watt seconds (usually abbreviated to W/s) but never in watts. Watt seconds is just another term that means exactly the same as Joules.
The figure expressed (300 for example) means that the flash head stores 300 Joules in its capacitors. It doesn't mean that 2 flashes with the same power output from 2 different manufacturers will have the same actual power because there are other factors that affect actual power, but it's a good guide. All things being equal, a flash of 300 Joules will produce the same amount of power during the flash (which could be as short as 1/2000th second) as a 300 watt continuous light can produce in ONE SECOND. In fact, the continuous light actually produces far less power than that simply because most of the energy is in the form of heat not light, so a THREE SECOND exposure with continuous lights is normally needed at the same lens aperture as flash.

Guide numbers are a more accurate method of expressing power. The guide number is always tested at 100 ISO and *should* always be tested with the flash head fitted with a standard reflector. Guide numbers can be expressed in two different ways, metres and feet. As long as you know which is which you can easily work out the real power of the light – say that the guide number is 160 (feet). Simply divide the distance in feet from the flash to the subject into that number and you'll end up with the lens aperture – so, at a distance of 10' from flash head to subject, the answer will be f/16 with the flash head at maximum power. If the guide number is expressed in meters the same flash head will have a guide number of 48 – 10' is 3 metres so 48 divided by 3 is f/16 – same result!
Of course, the guide number depends on the type and the efficiency of reflector used, it will be higher if you're shooting in a small room with white painted walls and ceiling, it will be a lot lower if you use an umbrella or softbox to diffuse the light, it will be lower still if you use a spotlight or honeycomb to control the light – but it's the best guide there is.
I think it's fair to say that 300 Joules is plenty for most home studio use with a 35mm or digital SLR camera. Larger cameras (medium and large format) need a lot more power, so do large groups of people or complex still life shots. A lot of people are happy with less power, preferring to increase the ISO setting on their camera when they need more power. Increasing the ISO setting reduces the image quality but different people have different needs.

Umbrella reflector, half the power output of the standard reflector

High intensity reflector, 6 times the power of the standard reflector

Standard reflector. This is the reflector that should be used when measuring guide numbers

Power adjustment.

It's no good having power if you can't adjust it!

Most modern flash heads can adjust from full to 1/16th power. That's a pretty good range and is plenty for most situations. Some have an even greater range of power adjustment but too much adjustment causes its own problems, so if you get a flash with say 6 or even 7 stops of adjustment don't assume that it's better – it may not be usable at the very lowest power settings because the colour temperature of the light may be unacceptable at low settings. If you really need to reduce the power more, just fit a neutral density gel over the light to cut down the power.

Some flash heads have ‘click stop’ adjustment, where the adjustment is something like full power, ½, ¼ etc and other have ‘stepless’ adjustment, which means that the power can be set literally anywhere. Stepless control is far better because it allows very precise adjustment.

Accessory fitting.

In the UK the main fittings are Elinchrom and Bowens, although there are others. There’s nothing to choose between them but there are more manufacturers of accessories available for Bowens (also known as S-fit) than for Elinchrom, and Bowens fit accessories are usually a lot cheaper too.

Some makes have different fittings and some use more than one – at the time of writing Interfit have a some lights that use their own fitting, some that use Bowens and some that use Elinchrom. Bear in mind that you’ll be limited to accessories that fit your lights, you can’t for example use Elinchrom fitting accessories on Bowens fitting lights!

And there are some lights that don’t have interchangeable accessories at all – the reflectors are fixed.

These lights tend to be at the cheaper end of the range and, although the suppliers can normally supply accessories to fit them obviously you’ll be pretty limited and won’t be able to control the quality of the light as much as if you have lights with removable reflectors. Whether that matters to you or not will depend on the type of photography that you want to do (or that you might want to do in the future). I’m not advising against lights that have fixed reflectors, it might be better for you to spend less and get less, but it’s something that you ought to bear in mind when you make your choice.

Modelling lamps

The only function of the modelling lamp is to give you an indication of the effect that the flash will have – it doesn’t affect the actual exposure at normal flash shutter speeds. If you’re using softboxes or even umbrellas in a well-lit room then dim modelling lights won’t help you to judge the light, so it’s a good idea to get lights with bright modelling lamps (at least 150 watts) but generally bright modelling lamps are only fitted to the better makes, so you pays your money and you takes your choice…

Some flash heads have fixed power modelling lamps, that are on full power all the time. Others have modelling lamps that can be set to reduced power when required or set to proportional power, so that the brightness of the modelling lamp reduces when the power setting is reduced. Proportional modelling lamps can be useful, but only if they’re bright enough to see with!

Fan

Some flash heads have a built in cooling fan and some don’t. Again, it depends largely on how much you want to spend. If you get lights without a fan then they’ll work just as well, but the flash heads won’t have such bright modelling lamps and they may overheat if you use them for too long. With a fan fitted, you can expect to be able to use them with accessories like softboxes and umbrellas continuously without risk of overheating. **Modelling lamps should never be left switched on if you’re using restrictive light shaping tools like honeycomb grids, spotlights or snoots**, because they’ll overheat.

Recharging time

The recharging time is the time it takes, after taking a shot, before the flash is ready to be used again. Like most things in life, the more you spend the better the performance, so if you spend a lot you should get a flash that recharges quickly and it you spend a little you may

have to wait a long time before the flash is ready to use again. Some of the cheaper flash heads take 4 seconds or more to recharge and 4 seconds is a very long time if you're shooting fashion or children but doesn't matter at all if you're shooting still life. Recharging time is something to be aware of and may or may not be important to you.

Flash ready indicator

As the name suggests, the indicator tells you when the flash is ready to fire. Again, what you get often depends on what you spend.

There may just be a neon indicator on the back of the flash head. If so that's fine, but if you're waiting to shoot you'll have to watch the control panel on the back of the flash and wait until the light comes on. And, if the flash head has been positioned behind you, or behind the subject, you won't be able to see that the indicator has come on.

Most flash heads have an annoying beep that lets you know when the flash is ready and the better ones usually allow you to turn the beep off if you don't want to hear it. If you're using more than one light it makes sense to switch the beeper on ONLY on the light that takes longest to recharge (the one set to the highest power) to avoid having to listen to a chorus of annoying beeps!

And some flash heads also have a 'modelling lamp off' indicator. What this does is to turn the modelling lamp off as soon as the flash fires, and it stays off until the flash is ready to fire again. Very useful! Again, you can expect to have a choice about whether to use this indicator.

So, the more expensive flash heads normally have several different ways of letting you know when they're ready to fire and the cheaper ones don't. A fairly small point, which may or may not be important to you, depending on the type of photography you do and on how you position your lights.

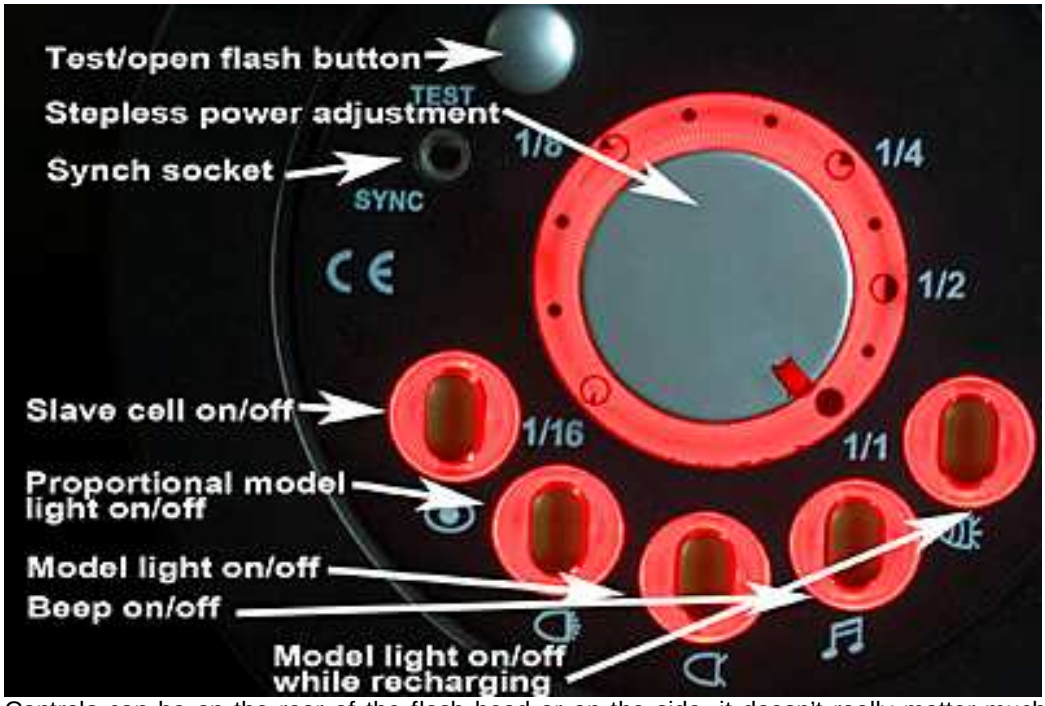
Flash sensor

All modern flash heads have a built in flash sensor. This 'sees' the flash from another flash and fires, which means that you only have to trigger one of the flashes (using a radio trigger or infra red trigger) for them all to fire. The flash that you fire from your radio or infra red trigger should be fitted with a diffused light (softbox or umbrella) so that the light spreads enough to be picked up by the slave sensor on any other flash heads that you're using.

Some flash heads have sensors that are sensitive to infra red light as well as to 'normal' light. This is important if you want to use an infra red trigger, or if you want to be able to fire the flash with a flash meter fitted with an infra red transmitter.

The best place for the sensor is the top of the flash head, where is can 'see' the flash from any direction.

Controls



Controls can be on the rear of the flash head or on the side, it doesn't really matter much although personally I feel that it's more convenient when they're on the back.
Controls may be simple switches, or dials or sliders, and some are illuminated when they're in use, which is helpful.
Some flash heads have digital displays, which tell you which power you've set the light to. Digital displays look pretty but don't really do anything that a dial or a slider can't do.
The only thing really worth mentioning about controls is that it helps if they're big and easy to use.

Spares

The only spares that you're likely to need are modelling lamps and fuses. Modelling lamps generally use a standard fitting (often the E27 Edison screw fitting) which is easy to get and others are often quartz lamps with 2-pin wire fittings, which again are usually available on the high street. It's a good idea to have at least one spare in stock. Fuses vary, but are usually easily available so aren't a problem – but again it's a good idea to have one or two spares, if the manufacturer hasn't supplied them with your flash heads.

Flash tubes can fail too, but they very rarely do, although of course they can also be broken accidentally. In case they do need to be replaced it's a good idea to get flash heads that have user changeable flash tubes (see picture above), it will save you the cost and inconvenience of having to return your flash head to the suppliers.

Warranty and customer service
It seems to me to make sense to get your lights directly from the manufacturer or importer, rather than from a retailer. Reputable retailers will give good service for as long as the product is under warranty but their obligation to you will end once the warranty has expired. Tempting though it is to save money by buying from Hong Kong or similar suppliers, lights are heavy and expensive to send back if they go wrong, so it's probably a good idea to buy from a local Company that specialises in lighting equipment.

Summary:
I've listed and explained the features that I think are important BUT what is important to me may not be important to you!
Only you can decide whether to buy the cheapest kit on the market, spend your children's inheritance on the best kit that money can buy or get something in between. Different people have different needs as well as different budgets!

How much power do you need?
This is a very big question, and impossible to answer in any meaningful terms - all I can usefully do is to give you some pointers so that you can work out the answer for yourself!

There are 3 main factors to take into account when arriving at your decision on power:

1. How close will your lights be to your subject? If you're photographing very small still life subjects (a mobile 'phone for example) your lights can be positioned very close and so very little power will be needed. But if you're photographing the warehouse that despatches the mobile 'phones, the lights will probably need to be very distant, and so an enormous amount of power will be needed. This applies to people photography too, a headshot using a softbox that's almost touching your subject will require very low power, a group shot of 20 people will need a lot more!

2. What size camera will you use? Depth of field is related to lens aperture, lens-to-subject distance, magnification, viewing distance, circle of confusion etc etc - but the single most important factor is the settings needed to obtain similar depth of field with different negative/sensor size. For example, if you're taking a shot with a 75mm lens on a 35mm or full frame digital camera at a distance of 3 metres and you need a depth of field of 0.88 metres, you will need to set your camera lens to f/11. But if you use a 5"x4" camera with equivalent lens (about 210mm) at the same distance the DOF at f/11 is only 0.39 metres and you will need to use an aperture of about f/24 to get dof of 0.88m - that's more than 2 stops, or more than 4 times the power requirement.

3. What about reflections from the ceiling and walls? This can make a big difference too - in a small studio with a low ceiling and white paint on the ceiling and walls, your light will bounce around everywhere and, as well as being softened, will be more intense than if you have a large studio with a high ceiling.

So, at first sight, it may look as if you need to get the most powerful flash units you can afford - but doing so might leave you with different problems!

You could have a problem if you want to use a wide aperture to limit depth of field - will your flash be too powerful? What if you're using a small digital camera with a minimum aperture of, say, f/5.6? Will you be able to reduce the power enough?

The answer is yes, you *can* reduce the power, and the easiest method is to buy flash units that have a wide range of adjustment.

If you're using a digital camera the ISO settings can be used to 'adjust' the level of overall flash power. 100 ISO is pretty much standard for studio work but flash power can be 'increased' if necessary by using higher ISO settings, although at the cost of reduced image quality. Professional digital equipment can often be used at much lower ISO settings.

So, to try to answer this question you first have to decide how large an area you're likely to have to light. If you're only going to produce head and shoulder portraits then 100J lights may be adequate, if you want to photograph large family groups you may need to think about 1000J or more, and if you want to use powerful lighting on small subjects then you definitely need to buy lights that can be adjusted from very low to maximum output.

How can you reduce the power of the lights?
Quite often, there is simply too much power to allow the use of large apertures – so how can you reduce it?

Obviously, the first thing to do is to turn the power down as far as you can, but sometimes this isn't enough, and if you turn it right down on some makes of light the colour temperature will change too much for acceptable results so here are some other methods. Some can be used with all types of flashhead (including hotshoe flashguns) and some can only be used with generator (pack and head) flashes.

All flash heads:

1. Fit a neutral density gel over the light. ND gels are available in a range of strengths, I recommend 0.9, which reduces the power by 3 stops; it's better to over-reduce and turn the power up than to carry a stock of different gel strengths.
2. Advantage: Lighting gels do not affect image quality.
3. Disadvantages: Powerful modelling lamps need to be turned off (because of the heat) or placed at a distance from the light, less powerful modelling lights do not produce sufficient power when used with gels to indicate the effect of the flash. Each light needs to be fitted with its own gel.
4. Fit a neutral density filter over the camera lens. ND filters are available in a range of strengths, again I recommend 0.9, which reduces the power by 3 stops; it's better to over-reduce and turn the power up than to carry a stock of different filter strengths.
5. Advantage: Filter fitted to lens affects all lights.
6. Disadvantages: As with all filters, there is a possible quality loss. Autofocus may not function well, especially with zoom lenses that do not have a large maximum aperture.

Generator lights:

As above, plus: Fit a 'deadhead' light. This is simply a second flash head, placed at a distance and facing away from the subject (but not towards the lens). This will divide the power between the flashheads, and with an extra light fitted to a two-head generator will reduce the power by 1 stop. If available, fit a cap in place of the reflector to ensure that the light cannot affect the lighting.

Summary:

1. How much power you need depends on
    a. the type of subject you want to photograph
    b. the size of room/studio you're working in
    c. the size of camera you're using, which affects the working aperture
    d. the type of lighting modifier you're using
    e. the distance between light and subject
    f. the reflectivity of the walls/ceiling of your room/studio

    g. the ISO setting on your camera

2. As I mentioned earlier, power is expressed in Joules or W/s, but this isn't really power output, just energy stored in the capacitors. The only meaningful expression of power is guide number. The guide number may be artificially inflated by using 'favourable' test conditions so if you can't test the guide number (using an incident light flash meter) for yourself before buying, you need answers to the following questions…
    a. which reflector was used for the test? (it should be the standard reflector)
    b. how large was the room used for the test? (it should be large enough, with high enough ceilings, for the ceiling and walls to be too far away to influence the results).

3. Too much power can be as bad as too little. You can reduce the amount of effective power by
    a. using neutral density gels over the lights
    b. using a neutral density filter over the camera lens
    c. using a camera with a larger sensor/film
    d. turning down the power of the flash. If there's too much adjustment you may get unacceptable colour shifts, if there's too little it will make your life difficult

So, this article may have helped you to understand the issues – but it hasn't really helped you to decide how much power is right for your needs…
Only you can make that decision but, if it helps, if I was making that decision and if I was mainly interested in producing creative portraits of single people or couples I would go for something like 300 J of power from a good manufacturer because:

1. 300 Joules is enough for most situations and allows the creative use of light shaping tools such as honeycomb grids, fresnel spotlights, focussing spotlights, beauty dishes and other 'light eating' tools as well as softboxes – and if you take your studio photography beyond the absolute basics you'll want to use these types of tools at some point
2. 300 Joules allows the camera to be used at 100 ISO in most situations, this will produce optimum image quality
3. 300 Joules with a 16-1 power adjustment range will allow you to set the power to anywhere between 19-300 J, which is enough adjustment, most of the time
4. If 300 Joules isn't enough on an occasional basis you can increase the ISO
5. Less power may be OK but sometimes you'll be using maximum power. Using the power on maximum will mean longer recycling times and will mean using all the resources of your light. Generally not a good idea. As an example, it's better to drive a 140 mph car at 70 than a 70 mph car at 70 – the car will be working well within it's maximum capacity and will handle better, brake better and place much less strain on the engine. The same applies to lights.