The following information contained within this document is designed to help you decide which is the best solution for your particular installation.

Types Of Dimmers -

Dimmers can be divided into three main groups depending on the light source being controlled

Resistive	These are designed to control lamps that have a filament, which emits heat and visible light. Typical lamps are standard GLS incandescent, Mains halogen.
Inductive	These dimmers are designed to control light sources which use **wire wound components** in the form of transformers. An example of this would be low voltage lighting.
Fluorescent	This light source requires a ballast for the lamp to operate.

Resistive dimmers - are rated by the ***maximum*** recommended wattage the unit will control. Overloading the dimmer or using it to control Inductive loads can cause damage to the dimmer.

Inductive Dimmers - are rated as VA (Volt amps) and have already been de-rated to allow for the current-in rush from the transformer.

Fluorescent dimmers - it is recommended that where fluorescent installations need to be dimmed, a High frequency analogue 1 – 10 volt ballast is used. This will result in lower dimming levels, smoother dimming control and a reduction in RFI.

Dimming of Electronic Transformers - today most electronic transformers can be controlled by a resistive type dimmer. However there are still some electronic transformers having the characteristics of an inductive load. Always check the transformer instructions to determine the type of load it represents. Hamilton's preferred electronic transformer is manufactured by Mode Lighting UK Ltd and is considered to be a resistive load. Another consideration, which needs to be clarified, is - Can the electronic transformer be dimmed with a phase angle leading edge dimmer, as some electronic transformers require trailing edge dimmers.

Step-by-Step guide for the layman

Question :	**Answer :**
What is dimming?	Dimming is the reduction of the power into, and therefore out of, a light source.
What are the advantages/uses of this?	Reducing the power into the light source reduces the power in the circuit. This will lead to a saving of energy and hence lower running costs. As a result, the life expectancy of the light source is also increased. Again this lowers the running costs of the system by reducing the amount of maintenance that a system requires. The reasons for using dimming are not all practical. Hotels, restaurants and many other establishments frequently use the dimming of lights to create different atmospheres in areas of a building.
Can any dimmer be used to control any light source?	No. There are various types of light source available. Not all of these are dimmable. Different types may require a different type of dimmer.
What can I use if there is a large lighting load to consider?	There are two different types of dimmers. The module type of dimmer is suitable for loads up to 1000 watts. Remote dimmer packs are recommended for loads exceeding 1000 watts. Remote dimmer packs can each control loads from 40 watts up to 5000 watts per channel. If this is still not enough then please speak to our Technical Dept.

Mains Voltage Resistive Loads

This range embraces domestic controls based on the traditional small plate dimmer and is suited to the smaller installations. Alternatively consider using a Mercury Litestat system. This offers additional enhanced atmospheric lighting schemes with a variety of control options. Commercial/industrial projects are also catered for by Mercury Litestat high specification dimmer packs. These offer a wider range of control options and are suitable for larger loads. All small plate dimmers are suitable for 230/240v AC 50HZ and are suitable for control of tungsten filament lamps (general service type to BS161) and most electronic transformers. It is recommended that you contact the manufacturer of the transformer to confirm that it is suited for dimming applications and that it is considered to be a resistive load.

There are three ratings of tungsten modules available:

400W	module has a range of 40W to 400W. and is available as two way operation
600W	module has a range of 100W and 600W and is available as two way operation
1000W	module has a range of 150W and 1000w and is available as two-way operation

These dimmers are available on all Hamilton Litestat decorative plates. For totals loads higher than 1000W use Mercury Litestat remote dimmer packs.

Operation

Two-way versions have push on/off operation. When switched on the dimmer selects one of two contacts L1, L2. The two-way version is suitable for two-way switching as found in stairways, halls, corridors etc.

Note : **Only one two way dimmer** can be connected in a two way circuit. The other control point must be a two-way switch.

For tungsten/incandescent loads, providing the total load on the circuit is within the rating of the dimmer and the dimmer selected is suitable for tungsten/incandescent loads, there should be no problems associated with the dimming. (**These dimmers are not suitable for control of energy saving PLC lamps)**

The need to de-rate a dimmer

When using Mains Voltage Halogen lamps such as GU9, GU10, GZ10 and Linear halogen lamps, dimmers should be de-rated by 25%, this helps compensate for the additional load due to arcing at the end of the lamp life cycle. This extra load can damage the dimmer.

Where possible it is better to use branded lamps such as those produced by GE, Osram, Philips and Sylvania. Generally these have an in-built thermal link and, should the lamp filament short out, the thermal fuse stops the inrush of current which can damage a dimmer. (LIF Technical Statement No.25).

Many cheaper imported lamps do not have this thermal link.

In some cases the number of dimmers on a plate must be de-rated because of the heat generated during normal operation.

Inductive Loads

Low voltage lighting very often requires dimming. To meet this requirement Hamilton Litestat has a range of dedicated dimmers, specially designed to cope with the inductive load produced by the transformer current. These controls are referred to as **inductive dimmers.** All plate dimmers are 230/240v AC 50Hz and are suitable to control the primary side of Laminated or Toroidal (Wire wound) transformers.

It is important to check that the transformers you are intending to use are suitable for dimming with a phase angle leading edge dimmer; this information can be obtained from the transformer manufacturer or supplier.
You must ensure the inductive load does not exceed the **vA** rating of the dimmer as the surges associated with the dimming of inductive loads can cause premature failure on the primary fuse in the transformer. **(Please contact our Technical Department for further advice.)**

The transformers should be as small as possible (e.g. it is better to use 2x100vA than 1x200vA transformer).

Transformers ideally should be fully loaded.

We stress again the total load on the circuit must be within the rating of the dimmer being used otherwise it will cause the dimmer to over heat and malfunction.

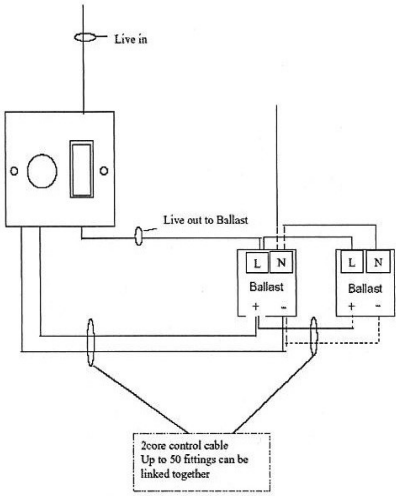
These dimmers are available on all Hamilton Litestat decorative plates. Alternatively consider using a Mercury Litestat system. This offers enhanced atmospheric lighting schemes with a variety of control options. For total loads higher than 500va use Mercury Litestat remote dimmer packs.

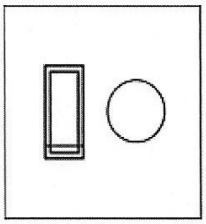
Fluorescent Loads

It is recommended that where fluorescent installations need to be dimmed, a high frequency analogue 1 – 10 volt regulated ballast or the Tridonic Switch Dim ballast is used. See also the Mercury Fluorescent Control Interface.

High frequency analogue 1 – 10 volt regulated ballast

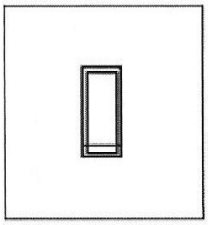
When using a standard 1-10 volt high frequency regulated ballast Hamilton's can offer a control that is suitable to operate up to 50 ballasts on a single circuit. The control consists of a regulator mounted next to a standard 20amp two way switch.





HF10V

Tridonic Switch Dim ballast



Push to Make switch

If using the Tridonic Switch Dim ballast then a standard push to make switch will operate the dimming function.
By keeping your finger on the switch the ballast will run through its dimming cycle.
When the desired level is reached, remove the pressure from the switch. A quick push on the switch will turn the lights on or of at that level.
(Momentary Control).

Dimmer Module and Plate Loadings

Resistive Loads :

Please note the reduced maximum rating when used with **Mains Voltage Halogen** lamps. It is recommended to contact the **manufacturer of the transformer** to confirm that it is dimmable and is considered to be a resistive load.

Leading Edge Dimmers:

No. of Gangs	Nominal Plate Size (mm)	Dimmer Type	Metal Plates			Wood Plates			Plastic Plates		
			Rating per Gang in Watts (W)			Rating per Gang in Watts (W)			Rating per Gang in Watts (W)		
			Tungsten Filament and Halogen	Tungsten Filament	Halogen	Tungsten Filament and Halogen	Tungsten Filament	Halogen	Tungsten Filament and Halogen	Tungsten Filament	Halogen
			Min	Max	Max	Min	Max	Max	Min	Max	Max
1	88 x 88	1x400W	40	400	300	40	400	300	40	400	300
2	88 x 88	2x400W	40	400	300				40	**300 ***	300
2	86 x 146	2x400W				40	400	400	40	**300 ***	300
3	86 x 146	3x400W	40	400	300	40	**300 ***	300	40	**250 ***	250
4	86 x 146	4x400W	40	**300 ***	300						
6	150 x 150	6x400W	40	**330 ***	300	40	**300 ***	300			
9	150 x 210	9x400W	40	**275 ***	275						
12	150 x 210	12x 400W	40	**200 ***	275						
1	88 x88	1x600W	100	600	450	100	600	450	100	600	450
1	86 x146	1x1000 W	150	1000	750	150	**800 ***	750			

*** derated to maximum allowed.**

Dimmer Module and Plate Loadings contd

Inductive Loads :

It is recommended to contact the **manufacturer of the transformer** to confirm that it is dimmable and is considered to be an inductive load.

No. of Gangs	Nominal Plate Size (mm)	Dimmer Type	Metal Plates		Wood Plates		Plastic Plates	
			Rating per Gang in VA		Rating per Gang in VA		Rating per Gang in VA	
			Min	Max	Min	Max	Min	Max
1	88 x 88	1x200vA	25	200	25	200	25	200
2	88 x 88	2x200vA	25	200			25	200
2	86 x 146	2x200vA			25	200		
3	86 x 146	3x200vA	25	200	25	200		
4	86 x 146	4x200vA	25	200				
6	150 x 150	6x200vA	25	200	25	200		
9	150 x 210	9x200vA	25	200	25	200		
1	88 x88	1x300vA	50	300	50	300	50	300
1	86 x146	1x500vA	100	500	100	500		

Fluorescent Loads :

It is recommended to contact the **manufacturer of the ballast** to confirm that it is dimmable by 0 – 10 Volt or Retractive Switch.

No. of Gangs	Nominal Plate Size (mm)	Dimmer Type	Max Ballast per Controller
1	88 x 88	**HHF10VR –** Analogue 0 –10 Volt Controller for High Frequency Regulated Ballasts	50
1	88 x 88	**RR21M –** Retractive Switch for Tridonic Switch Dim Ballasts	Up to maximum loading of switch

Mercury Litestat Analogue Dimmers

Mercury Litestat analogue dimmers can dim resistive and inductive loads. They consist of a power pack and a separate control unit (**known as an outstation**) mounted remotely from the main panel on a standard accessory plate.

Mercury Litestat dimming packs are identified as follows:

SM	+	number	+	suffix
Surface mounted		10		Type of control

A single dimming circuit is known as a 'Channel'. Multigang dimmers have more than one channel.

Channels can be controlled individually or together from one control.

Dimmer Pack Ratings: per Channel
4 Amps (1Kw)
or
10 Amps (2.5Kw)
or
20 Amps (5Kw)

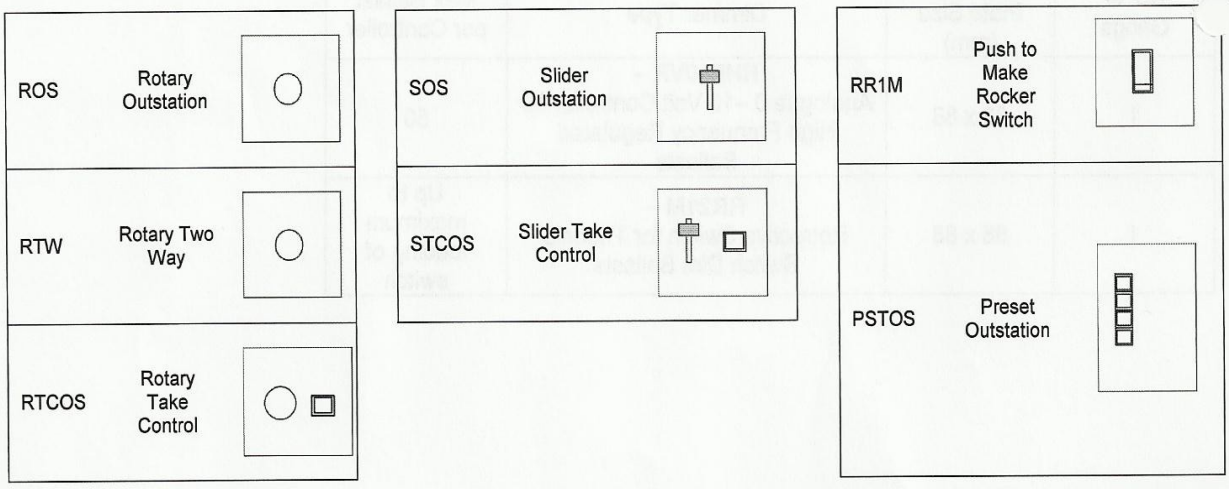
Dimmer Packs

Type	Minimum Rating W	Maximum Rating W		Control Methods Available		
		Resistive	Inductive			
SM04	40	1000	800	MT	MC	PST
SM10	40	2500	2000	MT	MC	PST
SM20	40	5000	4000	MT	MC	PST

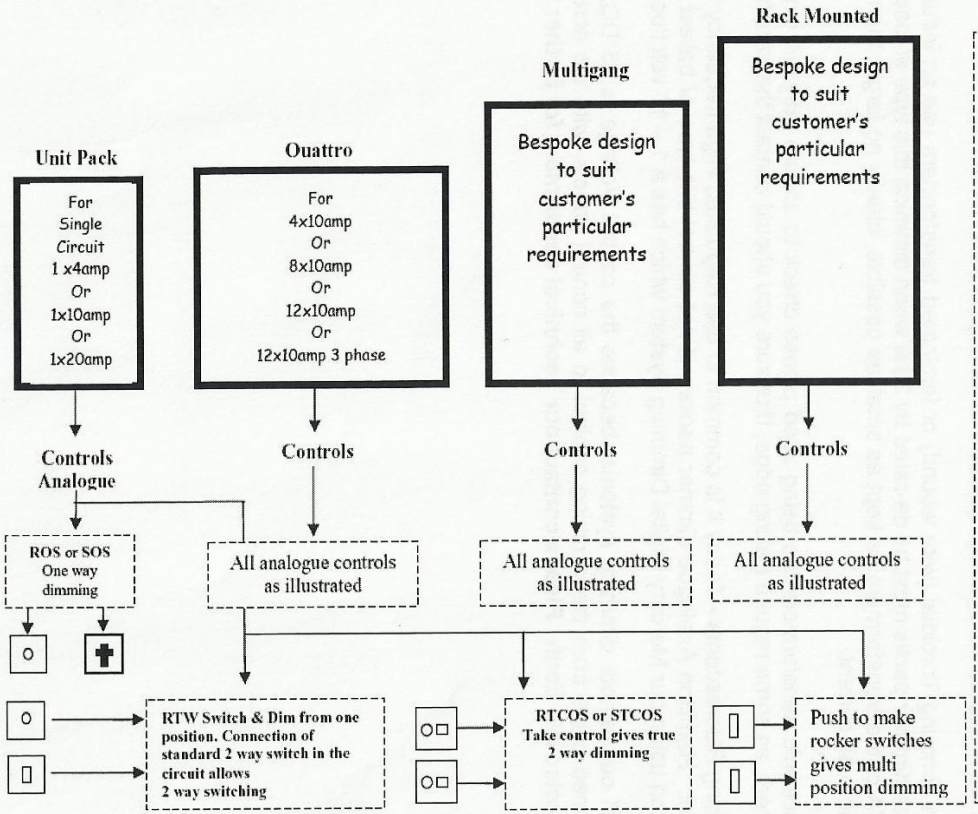
Outstations - are supplied from an isolated 15V DC supply within the dimmer pack. The analogue signal is 0-10V DC.

'Take control' is where ***Rotary*** multi-point dimming is required. Each control point consists of a rotary control plus a small illuminated button. If you are at point A, a quick push of the button takes the control to that point. Iif you then move to point B a quick push, on the button moves the control to point B. Within reason there is no limit to the amount of take controls you can have on a single circuit.

Multiple point control can be achieved using MC or PST channel. Dimming packs can be used on resistive or inductive loads.



Note *Normally, control options cannot be mixed on the same dimming pack.*
All outstation controls are available on most Hamilton Litestat decorative plates.



Glossary Analogue controls
ROS = Rotary outstation
SOS = Slider outstation
RTW = Rotary two way outstation
RTCOS = Rotary take control outstation
STCOS = Slider two way outstation

SM**MT	Surface mounted
QA410MT	Surface mounted
QA410MC	Surface mounted
SMMG**MT	Surface mounted
RM**MT	Rack mounted
QA--MT/3	Surface mounted 3 phase
SMMG—MT/3	Surface mounted 3 phase
RM—MT/3	Rack mounted 3 phase

Retractive Controls
R21M or any Push to make switch will operate
Hamilton's Mercury Litestat MC series dimmer packs

PLANNING A REMOTE DIMMER INSTALLATION

When planning to use a remote mounted dimming system the following should be taken into account

(1) How many circuits/channels?

(2) What is the total load (wattage) per circuit?

(3) What type of lamp is being used e.g. Tungsten, Low Voltage, or Fluorescent?

(4) What type of control is required e.g. Rotary, Slider, Momentary, Preset or Scene set?

(5) What type of system required e.g. Individual packs, Multi-gang or Rack mounted?

(6) The size of area to site the dimmer system? In case special size cabinet is required.

(7) Three Phase & Neutral (TP&N), or Single Phase & Neutral (SP&N)?

(8) What is the supply voltage e.g. (240V/415. 50Hz) (120V/220v.60Hz)?

(9) When dimming Toroidial (wire wound) or laminated transformers use an inductive rated dimmer. Our remote dimmer packs must be de-rated by 20% when dimming this type of load. It is recommended that the VA of the transformers be kept as small as possible, ideally no larger than 200VA due to their very high in-rush current.

If Electronic transformers are being used please check to ensure they will dim with leading edge type dimmers, as some require trailing edge. If unsure you should contact the transformer manufacturer

(10) Dimming Fluorescents - Today it is common to use Regulated High frequency ballasts using 1 – 10 volt control. Hamilton Analogue dimmer packs will not control this type of ballast and we offer a separate solution using our Mercury Digital Dimming System which has a 1 – 10 volt fluorescent interface

(11) On all our remote dimming systems, because the control Voltage is 15 DC, it is <u>essential</u> to use a screened cable from the dimming cabinet to all control panels, with the screening at one end being connected into Earth.