



FOR EXCELLENCE AND ELEGANCE

Welcome to your Guide to Dimming

R Hamilton & Co Ltd is one of the leading manufacturers of dimmers in the UK and markets its products under the Litestat brand name.

We offer a comprehensive range of equipment to suit most applications, from a standard 40W GLS lamp, to multi-channel systems controlling higher loads up to 5000 watts per channel.

Lamp technology is continually developing. We suggest consulting the technical sheets from industry bodies such as LIF (Lighting Industry Federation) to ensure an installation will reflect the latest current directives.

The following information contained within this document is designed to help you choose the best solution currently available for your particular installation. Should you have any questions regarding your system or relating to your system requirements please contact us via the details within this guide.

An easy to follow guide to help you understand some commonly used technical terms.

Essential information to help you choose the correct dimming system for your particular installation.

Pictorial references to help you understand the products we can provide to best suit your needs.

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, dimmable LED lamp.

Resistive dimmers (Leading edge) - 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. This dimmer will also dim constant current 230V dimmable LED drivers. Contact our technical department if you want to dim LEDs.

Resistive dimmers (Trailing edge) – Some of today's electronic transformers and light sources require a trailing edge dimmer which offers soft start, smooth control, silent running and multi-way dimming (touch control only).

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.

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

This light source requires a dimmable 1-10 volt High Frequency Regulated Ballast to be linked to the dimmer.

Fluorescent dimmers - It is recommended that where fluorescent installations need to be dimmed, a High frequency analogue 1 – 10 volt regulated ballast is used in conjunction with an on/off switch. This will result in lower dimming levels, smoother dimming control and a reduction in RFI. LED's can be dimmed with this dimmer by using a Constant Current 0-10V Driver.

Note: An additional 0.5mm 2-core cable must be installed between the ballast and the dimmer

Note: Dimming of Electronic Transformers

Today, most dimmable electronic transformers can be controlled by a resistive type dimmer. However, there are still some electronic transformers with the characteristics of an inductive load. Always check the transformer instructions to determine the type of load it represents. 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 voltage into, and therefore luminance out of, a light source.

What are the advantages/uses of this?

Reducing the voltage into the light source reduces the power consumption of the circuit. This will lead to a saving of energy and hence lower running costs. Also, the life expectancy of the light source is 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 three different types of dimmers.

1. The module type of dimmer is suitable for loads up to 1000 watts.
2. The ICDM1000 leading edge Ceiling Dimmer will control loads from 40-1000 watts.
3. Remote Mercury dimmer packs can each control loads from 40 watts up to 5000 watts per channel.

Mains Voltage Resistive Loads

This range embraces domestic or commercial controls based on the traditional small plate dimmer and is suited to smaller installations. Alternatively consider using a Mercury dimming system. This offers additional, enhanced atmospheric lighting schemes with a variety of control options.

Commercial/industrial projects are also catered for by Mercury dimming 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, while they are still on the market (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 to dimming applications and that it is considered to be a resistive load, and can be dimmed by either a leading or trailing edge dimmer.

There are four ratings of tungsten modules available:

250W (Trailing Edge) Module has a range of 25W to 250W. Suitable for multi-way operation with push-to-make retractive switches. Touch dimmers are suitable for multi-way dimming with Touch slaves.

400W (Leading Edge) Module has a range of 40W to 400W. Suitable for multi-way operation with 2-way and intermediate switches.

600W (Leading Edge) Module has a range of 100W to 600W. Suitable for multi-way operation with 2-way and intermediate switches.

1000W (Leading Edge) Module has a range of 150W to 1000W. Suitable for multi-way operation with 2-way and intermediate switches.

ICDM1000 (Leading Edge) Ceiling Dimmer 1000W. This Unit has a range of 40W to 1000W. Suitable for multi-way dimming with a push-to- make retractive switch and/or Hamilton touch slaves.

The above are available on all Hamilton decorative plates. For total loads higher than 1000W use Mercury remote dimmer packs.

Note: Operation

2-way versions have push on/off operation, and are suitable for 2-way switching as found in stairways, halls, corridors etc. To achieve 2-way control, a second switch must be installed in the circuit which then allows switching from another location.

Note: Only one 2-way dimmer can be connected in a 2-way circuit. The other control point must be a 2-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 additional load created by arcing at the end of the lamp life cycle. This extra load can damage the dimmer.

Where possible, use branded lamps such as those produced by GE, Osram, Philips and Sylvania. Generally these have an in-built fuse 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 fused link.

When using mains halogen lamps, the loads the dimmers are controlling must be de-rated because of the heat generated during normal operation.

Inductive loads laminated or toroidal (wire wound) Transformers.

To meet the requirement of dimming these older type transformers, Hamilton has a range of dedicated dimmers specially designed to cope with the inductive load produced by the transformer. 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).

Ideally, transformers 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 overheat and malfunction.

These dimmers are available on all Hamilton decorative plates.

Alternatively consider using a Mercury system. This offers enhanced atmospheric lighting schemes with a variety of control options. For total loads higher than 500VA use either the Hamilton ICDM1000 or Mercury remote dimmer pack.

Fluorescent Loads

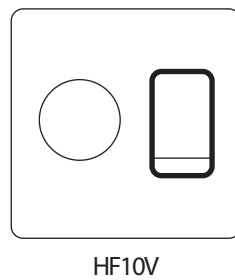
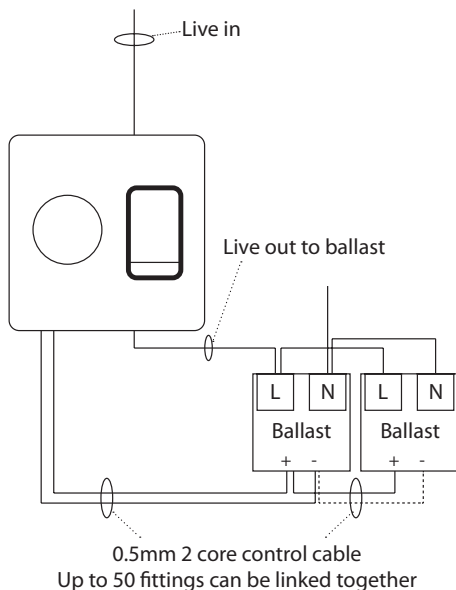
It is recommended that, where fluorescent installations need to be dimmed, a high frequency analogue 1 – 10 volt regulated ballast or the Tridonic Switch Dim ballast is used. See also the Mercury Fluorescent Control Interface.

COMPARISON AND FEATURES OF DIMMER TYPES

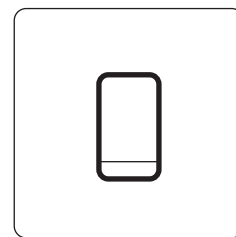
	Simple Leading Edge Dimmer x400	x200 VA	Intelligent Leading Edge Dimmer (ICDM1000W)	Trailing Edge Dimmer (XTE25 and XTM25)
Resistive Load	Yes	No	Yes	Yes
Inductive Load	No	Yes	No load condition protected	No load condition protected
Recoverable Over Load Protect	No	No	Recovery over load protected	Yes
Recoverable Short Circuit Protect	No	No	Yes	Yes, real time
Recoverable Thermal Protect	No	No	Yes	Yes
Non-Recoverable Overload Protected	No	No	Thermal cut off protected	Thermal cut off protected
Non-Recoverable Thermal Protected	No	No	Thermal cut off protected	Thermal cut off protected
Soft Start	No	No	Yes	Yes
Fading Off	No	No	Yes	Yes
Flicker	Flicker free for correct operating condition (loading not less than min. requirement)		Yes	Monitored
Audible Noise	Yes	Yes	Yes	No
Heat Generated	Yes	Yes	Yes	Yes

High Frequency Analogue 1 – 10V 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.



Tridonic Switch Dim Ballast



Push-to-Make retractive switch

If using the Tridonic Switch Dim ballast then a standard push-to-make retractive 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 off at that level. This is referred to as momentary control.

N.B. Polarity sensitive!

DIMMER MODULE AND PLATE LOADINGS FOR 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.

The table below is to be read in conjunction with the information given in the subsequent tables.

	Resistive	Inductive	Trailing Edge Push	Trailing Edge Touch Master	Touch Slave
	1x400 2x400 3x400 4x400 1x600 1x1000	1x200VA 2x200VA 1x300VA	1xTE25 2xTE25 3xTE25 4xTE25	1xTM25 2xTM25 3xTM25 4xTM25	1xTS 2xTS 3xTS 4xTS
Tungsten filament GU10 lamps must be branded with a fused base.	Y	N	Y	Y	Y
When using mains voltage halogen lamps - dimmers should be de-rated by 25%	Y	N	Y	Y	Y
When using mains voltage halogen load transformers - maximum rating is 210VA	N	N	N	Y	Y
To only be used with Touch Master Dimmers	N	N	N	N	Y

TRAILING EDGE DIMMERS:

No. of Gangs	Nominal Plate Size (mm)	Dimmer Type	Metal Plates			Wood Plates		
			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
			Min	Max	Max	Min	Max	Max
1	88 x 88	1x250W	25	250	250	25	250	250
2	88 x 88	2x250W	25	250	250			
3	86 x 146	3x250W	25	250	250	25	250	300
4	86 x 146	4x250W	25	250	250			
6	150x150	6x250W	25	250	250	25	250	250
9	150 x 210	9x250W	25	250	250			
12	150 x 210	12x250W	25	200*	200			

* de-rated to maximum allowed.

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	88x88	1x400W	40	400	300	40	400	300	40	400	300
2	88x88	2x400W	40	300	300				40	300*	300
2	86x146	2x400W				40	300	300	40	300*	300
3	86x146	3x400W	40	300	300	40	300*	300	40	250*	250
4	86x146	4x400W	40	300*	250						
6	150x150	6x400W	40	250*	250	40	200*	200			
9	150x210	9x400W	40	250*	250						
12	150x210	12x400W	40	200*	275						
1	88x88	1x600W	100	600	450	100	600	450	100	600	450
1	86x146	1x1000W	150	1000	750	750	800*	750			

Note: Maximum recommended load on single plate is 600 watts

* de-rated to maximum allowed.

DIMMER MODULE AND PLATE LOADINGS FOR 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
1	88 x 88	1x200vA
2	88 x 88	2x200vA
2	86 x 146	2x200vA
3	86 x 146	3x200vA
4	86 x 146	4x200vA
6	150 x 150	6x200vA
9	150 x 210	9x200vA
1	88 x 88	1x300vA
1	84 x 146	1x500vA

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
25	200	25	200	25	200
25	200			25	200
		25	200		
25	200	25	200		
25	200				
25	200	25	200		
25	200	25	200		
50	300	50	300	50	300
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	88x88	HHF10VR- Analogue 0 –10 Volt Controller for High Frequency Regulated Ballasts	50
1	88x88	RR21M- Retractive Switch for Tridonic Switch Dim Ballasts	Up to maximum loading of switch

Mercury Digital Dimmers

Mercury Digital dimmers can dim resistive, inductive, 0-10V HFR Ballasts, certain mains LED and LED drivers. With our 10A Volt free Relay unit, they can control any “non dim” circuit. With an RS232 interface card, the system can be controlled by a 3rd party device.

These dimmers consist of a power pack and a separate control unit. The control unit can be either a push-to-make retractive switch, Rotary control or a Scene control panel mounted remotely from the main panel (using a CAT5 cable) on a standard accessory plate. The system also offers control from an Infra-Red handset.

Mercury Litestat dimming packs are identified as follows:

SM	+	Number of Channels	+	D	+	Load/Circuit type
Surface mounted		1		Digital		0.6, 1.2, 2.5, 5.0, VFR or DHF

- A system can have a combination of any load or circuit type in one enclosure.
- 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.

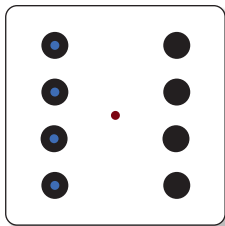
Dimmer Pack Ratings: per Channel

0.6 (600W), 1.2 (1200W), 2.5 (2.5Kw), 5.0 (5Kw), VFR (10A Volt Free Relay) or DHF (0-10V HF Ballast/Drivers)

On a Multi-gang system there is MCB protection.

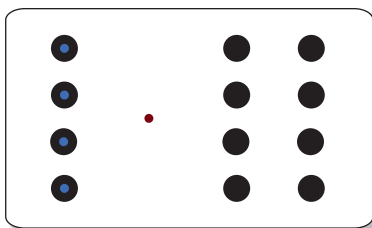
CONTROL PANELS

Are supplied from an isolated 5V DC supply within the dimmer pack. Wired with CAT5 UTP (unscreened 4 x twisted pairs) or STP (screened 4 x twisted pairs) when running next to mains cable.



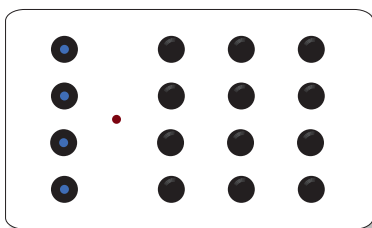
IR4B+4M

Master programmable control panel with 4 scene recall buttons with blue LED indication, plus 4 individual buttons to raise/lower light level of each circuit. and to switch on/off. Up to 4 circuits can be controlled with this control panel. Includes a built-in Infra Red receiver. This control panel can be mounted on any of the Hamilton ranges of single gang plates.



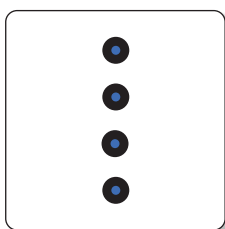
IR4B+8M

Master programmable control panel with 4 scene recall buttons with blue LED indication, plus 8 individual buttons to raise/lower light level of each circuit and to switch on/off. Up to 8 circuits can be controlled with this control panel. Includes a built-in Infra Red receiver. This control panel can be mounted on any of the Hamilton ranges of double gang plates.



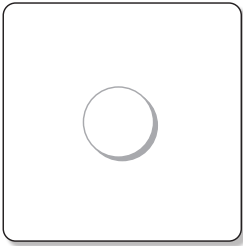
IR4B+12M

Master programmable control panel with 4 scene recall buttons with blue LED indication, plus 12 individual buttons to raise/lower light level of each circuit and to switch on/off. Up to 12 circuits can be controlled with this control panel. Includes a built-in Infra Red receiver. This control panel can be mounted on any of the Hamilton ranges of double gang plates.



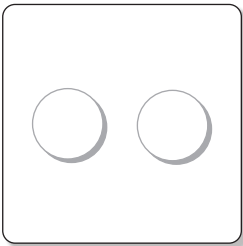
4SRC

Non Programmable Scene slave controller: each scene also acts as on/off button. To be used in conjunction with a Master. For multi-way scene control. This control panel can be mounted on any of the Hamilton ranges of single gang plates.



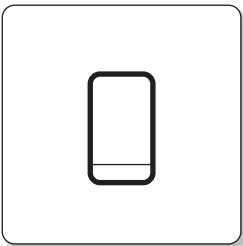
RESX1

1 gang Rotary decoder. Turn Clockwise to raise light level, anti-clockwise to lower the light level. Push to turn the lighting circuit on/off. A prolonged push of the control knob will also raise/lower the light level. This control panel can be mounted on any of the Hamilton ranges of single gang plates.



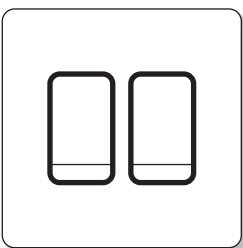
RESX2

2 gang Rotary decoder. Turn Clockwise to raise light level, anti-clockwise to lower the light level. Push to turn the lighting circuit on/off. A prolonged push of the control knob will also raise/lower the light level. This control panel can be mounted on any of the Hamilton ranges of single gang plates.



RR1DC

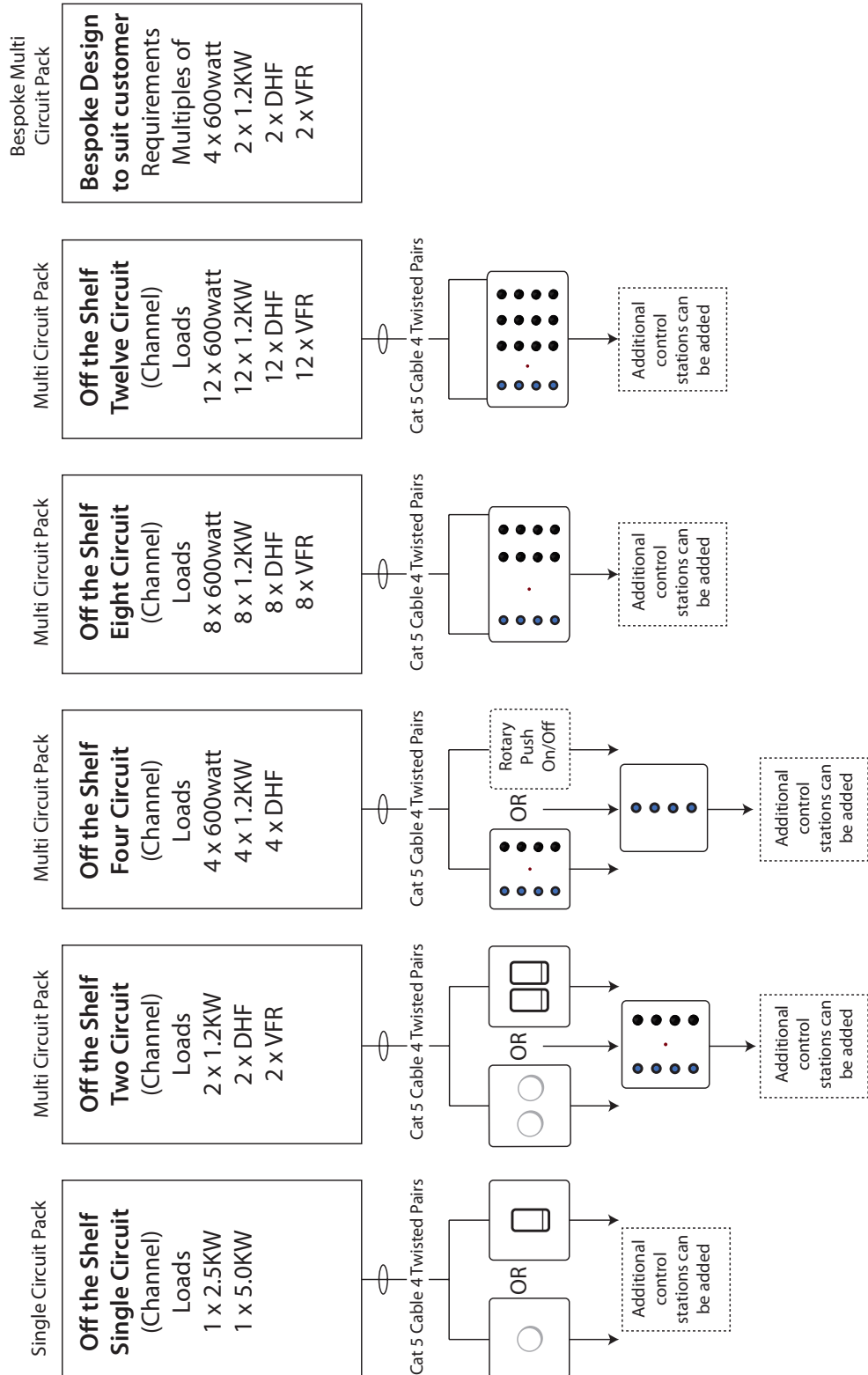
1 gang push-to-make retractive switch. A brief push to turn the lighting circuit on/off. A prolonged push of the switch will also raise/lower the light level. This control panel can be mounted on any of the Hamilton ranges of single gang plates.



RR2DC

2 gang push-to-make retractive switches. A brief push to turn the lighting circuit on/off. A prolonged push of the switch will also raise/lower the light level. This control panel can be mounted on any of the Hamilton ranges of single gang plates.

REMOTE DIMMER TYPES FROM HAMILTON:



Products available from Hamilton:

- | | | |
|--|--|--|
| <input type="checkbox"/> Perception CFX® | <input type="checkbox"/> Cheriton Victorian | <input type="checkbox"/> Ceiling Dimmers |
| <input type="checkbox"/> Hartland | <input type="checkbox"/> Cheriton Edwardian | <input type="checkbox"/> Electronic Transformers and LED Drivers |
| <input type="checkbox"/> Hartland CFX® | <input type="checkbox"/> Woods & Bloomsbury | <input type="checkbox"/> Grid-IT |
| <input type="checkbox"/> Hartland CFX® Colours | <input type="checkbox"/> Hotel Switch Card | <input type="checkbox"/> EuroFix Data and Media Range |
| <input type="checkbox"/> Sheer | <input type="checkbox"/> USB Charger/Power Socket | <input type="checkbox"/> IP Weatherproof |
| <input type="checkbox"/> Sheer CFX® | <input type="checkbox"/> Multi Room Audio System | <input type="checkbox"/> Metalclad |
| <input type="checkbox"/> The Linea-CFX® Collection | <input type="checkbox"/> Digital Mercury Lighting Controls | <input type="checkbox"/> Architectural Ironmongery |
| <input type="checkbox"/> Linea Rondo-CFX® Piano Black | | |
| <input type="checkbox"/> Savile Row Bespoke Wiring Accessories | | |

For further details on any of our products, including downloads of our catalogues, please visit our website.

www.hamilton-litestat.com

Alternatively contact our sales team at our Head Office in Mere
T: 01747 860088

All information is correct at the time of going to press. Hamilton reserve the right to alter any information without prior notice.



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