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FOR many years, fluorescent lighting has been used to provide the main illumination in public areas. The reasons for this are well known, but so often the results are over-powering; hotel and hospital corridors, road tunnels, museums, and art galleries are often flooded with a harsh light which is not only unpleasant but also wastes energy.

Corridors, for example, are often lit by fluorescent tubes mounted end to end, providing a very even but sometimes excessive light level throughout the length of the corridor, and, at night, they do not need to be lit as brightly as during the day.

The answer is to use electronic dimming techniques. Electronic dimmers can provide continuous dimming over a large illumination range, typically down to 5 per cent of maximum output. In addition, such dimmers are well-suited to automatic control using light sensing devices, remote control stations, and time switches.

Most electronic fluorescent dimmers use a phase control technique to regulate light level.

The phase control technique chops the normal mains waveform by using a form of electronic switch called a thyristor or silicon controlled rectifier (SCR). The thyristor is switched on for only a part of each mains half cycle, the amount being determined by the light level required. Because thyristors only conduct current in one direction, two thyristors are generally used, wired together in a back-to-back configuration so that they conduct during alternate half cycles.

Thyristor switching

A thyristor is a form of electronic latching switch. If a small positive voltage is put on the control input of the thyristor (known as the gate) with respect to the cathode, current will flow through the device, from the anode to the cathode. If the current is greater than the specified latching current of the device then the atomic structure inside changes and the device is latched. This means that the gate signal can be removed and still leave the anode-cathode current flowing. The thyristor can only be switched off if the current is reduced to less than the specified holding current of the device, or by a reverse polarity being introduced across the device.

The dimmers have a control circuit that is used to switch the thyristors on at the correct point in each mains half cycle. The method used for switching on the thyristors varies depending on the quality (and

Left: Strip fluorescents near to windows can be dimmed to take account of natural lighting and provide more even illuminance levels across office areas.

Inset: Environ 2 fluorescent dimmer.

