

## Flori-67/4P Plug-in 110V 4C LED Lighting System

Flori-67/4P is a 4 pin, 110V, plug-in, site lighting system enabling standard and emergency fittings to be wired on the same circuit and switched off at the end of each shift without damaging the batteries within the emergency fittings. By switching off all lights, sites can substantially reduce CO<sub>2</sub> emissions and electricity consumption.

Flori-67/4P comprises 100 metre lengths of 1.5mm<sup>2</sup> or 2.5mm<sup>2</sup>, 4C, yellow, PVC Arctic grade cable with a moulded-on Flori-67/4P outlet every 5 metres, 7 metres or 10 metres. LED fittings are stocked in two sizes: 37W 5' single and 27W 2' twin and both sizes are available in standard and maintained emergency formats. Fittings are pre-wired with a 2 metre input lead complete with a 4 pin adaptor, which plugs into the outlets moulded to the Flori-67/4P supply cable. Fittings are supplied complete with hooks, and are ready to use.

Flori-67/4P can be part of a fully automatic lighting control system using site transformers with integral time clocks and optional RCD protection (RCDs are likely to be required to achieve a 5 second disconnection time on longer 110V lighting circuits). Alternatively, lighting can be manually controlled by using an in-line switch assembly (S060727), which plugs into a standard 16A 110V socket. Both systems are described in detail over leaf.

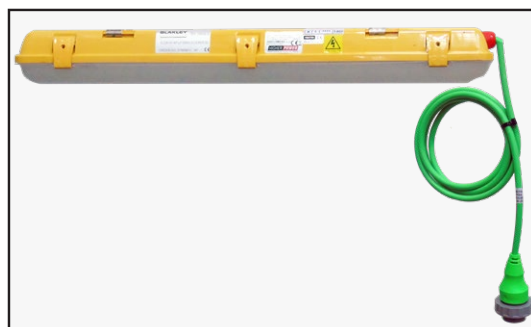
Emergency fittings are available in two formats. Those with a Green Adaptor and a Green input lead utilise a 4 core cable which enables the LED array to be SWITCHED OFF at the end of a shift but for an unswitched supply to be provided for the emergency pack. Those with a Red Adaptor and a Yellow input lead utilise a 3 core cable with the LED array and emergency pack permanently supplied i.e. the array remains ON at the end of the shift.

All Standard fittings incorporate a Black Adaptor and Yellow input lead utilising a 3 core cable i.e. all arrays can be SWITCHED OFF at the end of a shift. See page 3 for the different connection configurations of 3 core cable to Black and Red 4 pin Adaptors.

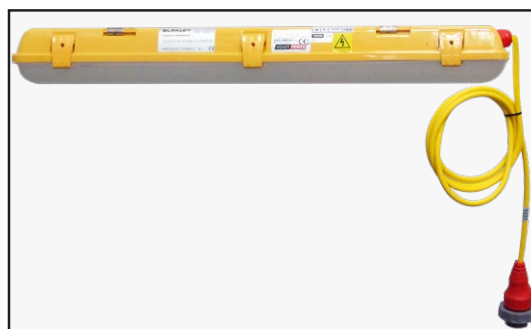
Flori-67/4P connectors are rated at 6 amps and have been Type Tested in accordance with BS EN 60309-1:1999 and are classified as watertight.



S060920H - 2' Twin Standard 27W LED with Black Adaptor (switched array)



S060922H - 2' Twin Emergency 27W LED with Green Adaptor (switched array)



S060921H - 2' Twin Emergency 27W LED with Red Adaptor (unswitched array)



Standard site transformers provide a 16A 110V 3P supply to an In-Line Switch assembly (ILSA), which provides a 4P "switched" supply to Flori-67/4P. The use of an ILSA enables fittings fed from a standard site transformer to be controlled (switched OFF) without damaging the batteries in emergency fittings.

## Luminaires

IP65 anti-corrosive 110V fittings incorporating 27W or 37W LED arrays with or without 3 hour maintained emergency battery back-up. Fittings are complete with suspension hooks.

## Emergency Modules

These are “maintained” (the array operates normally when there is a 110V supply to the luminaire) and incorporate a battery pack which, when fully charged, provides 3 hours of illumination if the 110V supply fails. To prevent damage to the batteries, a supply must always be provided to the emergency module in normal operation (see adjacent diagrams). Please note: discharged batteries require up to 24 hours to fully recharge.

## Energy Saving

Page 4 of this data sheet shows the savings that can be made by switching off lights “out of hours”. Also shown are the average illumination levels for various types of anti-corrosive fittings and details of the savings that have been made by the move to LEDs.

The Blakley website has a calculator that shows the savings in CO<sub>2</sub> emissions and energy costs when lights are turned off. The Savings Calculator is located at: [www.blakley.co.uk](http://www.blakley.co.uk) click Products, click Blakley Calculator and select the Savings Calculator work sheet.



Flori-67/4P Outlet and Adaptor

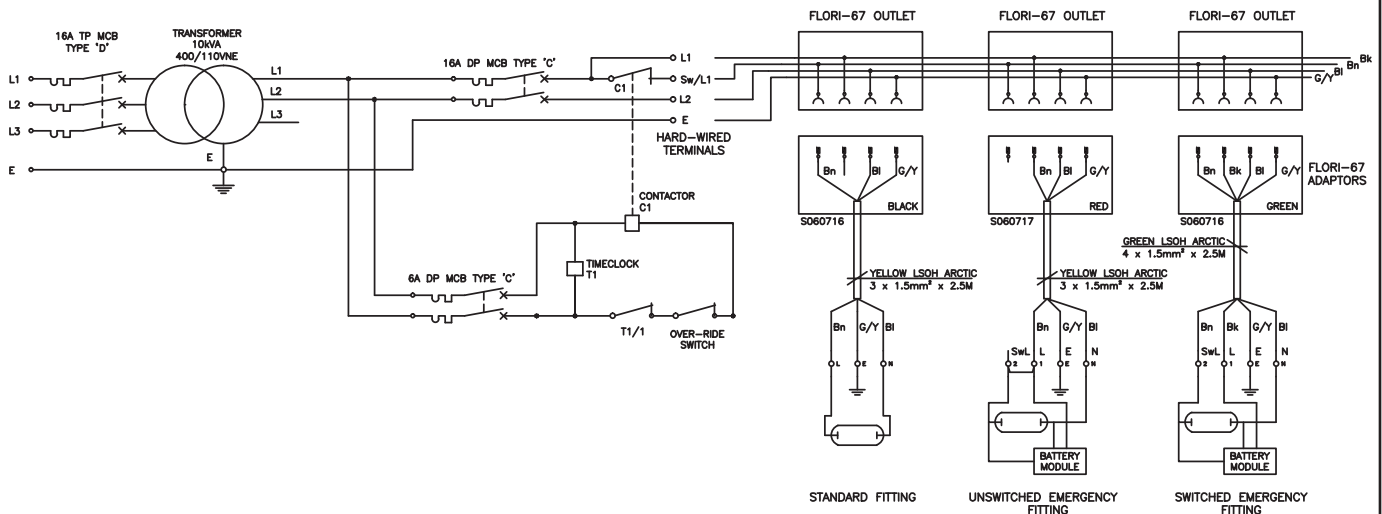


Lighting Transformer with time clock controlled, S210305

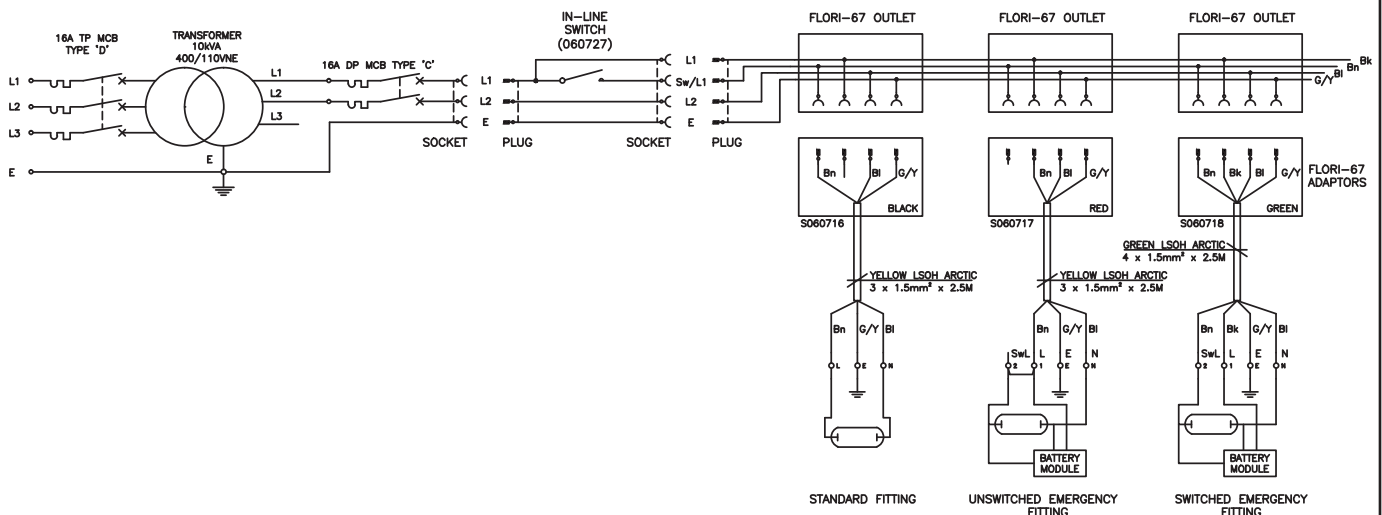
Part No.	Type No.	Description
Anti-corrosive LED fittings, 110V, IP65, pre-wired with Flori-67/4P Adaptor, supplied c/w suspension hooks		
S060920H	FLORI-67/4P/27W/LED	Standard 27W LED with Black Adaptor
S060921H	FLORI-67/4P/27W/LED/EMER/3C	Emergency 27W LED with Red Adaptor (unswitched array)
S060922H	FLORI-67/4P/27W/LED/EMER/4C	Emergency 27W LED with Green Adaptor (switched array)
S060923H	FLORI-67/4P/37W/LED	Standard 37W LED with Black Adaptor
S060924H	FLORI-67/4P/37W/LED/EMER/3C	Emergency 37W LED with Red Adaptor (unswitched array)
S060925H	FLORI-67/4P/37W/LED/EMER/4C	Emergency 37W LED with Green Adaptor (switched array)
Flori-67/4P 100m strings, 110V incorporating PVC Arctic Grade cable with yellow outer sheath		
S060713	FLORI-67/4P/5/1.5/100m	100m 1.5mm <sup>2</sup> 4C cable with a Flori-67/4P outlet every 5m
S060714	FLORI-67/4P/7/1.5/100m	100m 1.5mm <sup>2</sup> 4C cable with a Flori-67/4P outlet every 7m
S060715	FLORI-67/4P/10/1.5/100m	100m 1.5mm <sup>2</sup> 4C cable with a Flori-67/4P outlet every 10m
S060707	FLORI-67/4P/5/2.5/100m	100m 2.5mm <sup>2</sup> 4C cable with a Flori-67/4P outlet every 5m
S060708	FLORI-67/4P/7/2.5/100m	100m 2.5mm <sup>2</sup> 4C cable with a Flori-67/4P outlet every 7m
S060709	FLORI-67/4P/10/2.5/100m	100m 2.5mm <sup>2</sup> 4C cable with a Flori-67/4P outlet every 10m
S060728	FLORI-67/4P/5/1.5/100m/16A	As S060713 but fitted with a 16A, 3P+E plug
S060729	FLORI-67/4P/7/1.5/100m/16A	As S060714 but fitted with a 16A, 3P+E plug
S060730	FLORI-67/4P/10/1.5/100m/16A	As S060715 but fitted with a 16A, 3P+E plug
S060731	FLORI-67/4P/5/2.5/100m/16A	As S060707 but fitted with a 16A, 3P+E plug
S060732	FLORI-67/4P/7/2.5/100m/16A	As S060708 but fitted with a 16A, 3P+E plug
S060733	FLORI-67/4P/10/2.5/100m/16A	As S060709 but fitted with a 16A, 3P+E plug
Flori-67/4P Accessories		
S060727	FLORI-67/4P/ILSA	In-Line Switch Assembly c/w a 16A 3P plug and a 16A 4P coupler
S060820	FLORI-67/4P/3C/BLACK	Black Adaptor c/w 2.3m 1.5mm <sup>2</sup> 3C Yellow cable
S060821	FLORI-67/4P/3C/RED	Red Adaptor c/w 2.3m 1.5mm <sup>2</sup> 3C Yellow cable
S060822	FLORI-67/4P/4C/GREEN	Green Adaptor c/w 2.3m 1.5mm <sup>2</sup> 4C Green cable
S060155	Jack Chain	Supplied in 10 metre lengths
Complementary Products - 10kVA three-phase site lighting transformers with integral time clock and contactors		
S210078	TA/P/3/10/C6-16/TC/4C	Fitted with 6 no. 16A DP MCBs / lighting glands
S210305	TA/P/3/10/C6-10/RCCB/TC/4C	Fitted with 6 no. 10A DP MCB + RCCBs / lighting glands

## Automatic and Manual Lighting Control Systems Using Stock Transformers and Flori-67/4P

1) LIGHTING TRANSFORMER WITH INTERNAL TIMECLOCK CONTROL (S210078)  
(HARD-WIRED ARRANGEMENT)



2) STANDARD TRANSFORMER WITH SOCKETS (S210230)  
PLUS IN-LINE SWITCH ASSEMBLY (S060727)  
(PLUG-IN ARRANGEMENT)



NOTES:—

- 1) ONLY ONE OUTGOING CIRCUIT PER TRANSFORMER SHOWN FOR CLARITY.
- 2) STANDARD NON-EMERGENCY FITTINGS (S060716) ARE TURNED ON AND OFF BY EITHER THE TIME-CLOCK OR THE IN-LINE SWITCH.
- 3) NON-SWITCHED (3 WIRE) EMERGENCY FITTINGS (S060717) ARE NOT SWITCHED BY THE TIMECLOCK OR THE IN-LINE SWITCH, THUS REMAINING CONTINUOUSLY ON AND UNDER CHARGE.
- 4) SWITCHED (4 WIRE) EMERGENCY FITTINGS (S060718) ARE TURNED ON AND OFF EITHER BY THE TIMECLOCK OR BY THE IN-LINE SWITCH. HOWEVER THE CHARGING SUPPLY REMAINS CONNECTED TO THE FITTING AT ALL TIMES.
- 5) NOTE THAT IN-LINE SWITCH ASSEMBLY INCORPORATES A 16A 110V 2P+E PLUG AND A 16A 110V 3P+E COUPLER.
- 6) FLORI-67 STRINGS ARE AVAILABLE EITHER UNWIRED OR WITH A 16A 110V 3P+E PLUG.
- 7) NOTE THAT THE CONTACTORS ARE NORMALLY CLOSED. SHOULD THE PROTECTION MCB TRIP AND THE CONTROL CIRCUIT LOSE POWER, THE CONTACTOR WILL DE-ENERGISE AND TURN ON THE LIGHTING.

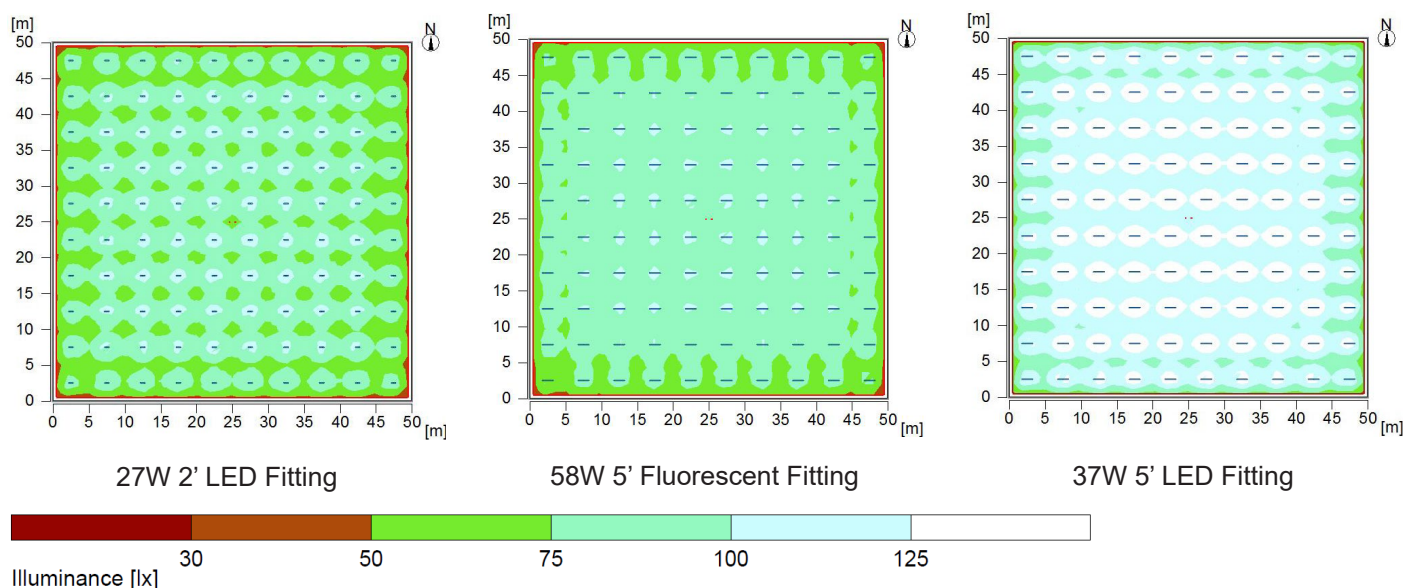
Use the Blakley Calculator @ [www.blakley.co.uk](http://www.blakley.co.uk) to calculate the CO<sub>2</sub> and £££s that can be saved simply by switching off lights.

## Comparison of Running Costs for LED and Anti-Corrosive Fluorescent Luminaires

Annual Electricity costs to supply 100 fittings based on £0.20 per kWhr for 365 days				
Daily Usage	10 hours per day	12 hours per day	14 hours per day	24 hours per day
27W LED	£1971.00	£2365.20	£2759.40	£4730.40
37W LED	£2701.00	£3241.20	£3781.40	£6482.40
58W Fluorescent	£4234.00	£5080.80	£5927.60	£10161.60

As can be seen, installing 100 x 30W LEDs in place of 100 x 58W fluorescents and switching lights OFF for 12 hours per day reduces the annual consumption cost from £6096.96 to £1576.80 - a saving of 74%

## Comparison of Average Illumination between LED and Anti-Corrosive Fluorescent Luminaires



The three schemes shown above are based on: a room measuring 50m x 50m; a luminaire every 5 metres in the X and Y axis; a mounting height of 3 metres; the floor as the working plane; a reflectance level of 20% for all surfaces. A maintenance factor of 0.67 has been applied to the scheme based on fluorescent lights and a maintenance factor of 0.72 to the schemes based on LED lights, due to the longer “lamp” life of LED arrays. As a reduction in average lux of 2 lux cannot be detected by the human eye, 2' 27W LED fittings can be used in place of 5' 58W 110V fluorescent fittings on a 1 for 1 basis, which results in energy cost savings of 50%.

Summary of illumination levels, running costs and emissions based on 100 luminaires per annum

Luminaire	Average Lux	Average Uniformity	Consumption	Cost per year #	CO <sub>2</sub> per annum #
27W LED	77	0.72	2.7 kW per hour	£4730.40	5.5 tonnes
37W LED	110	0.70	3.7 kW per hour	£6482.40	7.5 tonnes
58W Fluorescent	79	0.72	5.8 kW per hour	£10161.6	11.8 tonnes

# Based on 100 fittings operating 24 hours per day, for 365 days (at a cost of £0.20 per kWhr & 0.233 kg CO<sub>2</sub> per kWhr)

The compact 27W anti-corrosive LED has replaced the 5' 58W fluorescent as the “industry standard” for lighting open floor areas, corridors and stairwells. It should generally only be necessary to install 5' 37W LED fittings when a high level of illumination light is required or to illuminate large diameter tunnels.

Adopting 27W LEDs (in place of 58W fluorescents) also halves the load current and the volt drop, enabling a lighting circuit of up to 20 no. 27W luminaires to be protected by a 6A DP MCB, which reduces the need to adopt RCD protection in order to achieve a disconnection time of 5 seconds on longer 110V circuits.

In emergency mode, the light output of LEDs is greater than with fluorescents. In the above generic schemes, if every other fitting is a maintained emergency, the minimum lux level achieved with fluorescent fittings is 1 lux and with LEDs the minimum is 2 lux.