# Permanently powered LED Drivers – March 2022

## 1. Background

At the UMSUG meeting in September 2021, PDA presented a paper (UMSUG 133/04) outlining an issue with LED drivers that were permanently powered and providing an auxiliary output for equipment operating at DC, such as lighting controls (PECUs and CMS nodes) and other equipment.

The UMSUG recommended that the second of the two approaches outlined in the paper to capture the energy used by the driver whilst in standby mode should be adopted. PDA took an action to prepare redlined amendments to the Operational Information Document.

## 2. Rationale for proposed amendments

LED drivers have been developed to include additional DC outputs that will power equipment added to street lighting columns, for example as part of a Smart City initiative such as air quality sensors, traffic counters and other ancillary equipment. It may also be used to power a PECU/CMS Node. This requires that the LED driver acts as a power supply unit (PSU) and needs to be powered 24 hours per day unlike traditional drivers.

If a driver is powered 24 hours per day converting the mains supply at a nominal 230V AC to 24V DC (or similar) it will incur continuous power losses that need to be included in the daytime energy consumption whilst the LED lamp is switched off. Any existing power losses incurred by the driver in powering the LED lamp at night are included in its lamp circuit watt rating.

PDA discussed this issue with several lighting and control manufacturers following the September 2021 UMSUG meeting. The majority were in favour of the UMSUG recommendation to apply an uplift to the circuit watt rating of the lighting control. This approach ensures that the continuous energy usage is captured throughout the 48 HH settlement periods.

The recommendation was to set the uplift at 0.5 watt. This may not be an exact reflection of the power losses because they will be variable depending upon the manufacturer. The alternative is not practical as it would involve multiple charge codes for the same lighting control depending upon the continuous power loss of the particular driver installed. The uplift of 0.5W is considered to be a pragmatic approach and represents a reasonable average of the power losses incurred based upon the information we have been able to obtain through internet searches and discussions with manufacturers.

## 3. Proposed amendments to the Operational Information Document.

Whilst the issue was identified following the development of LED drivers to provide auxiliary DC power outputs, it has been recognised that alternative lighting sources may be developed that can provide similar low voltage outputs. The following proposed amendments have been prepared to include all types of lamp driver and voltages.

## 3.1. Paragraph 2.3.5

A misconception that lighting controls powered by the lamp driver did not require a Control Charge Code was noted. The table at this section should be amended to include a specific reference to Time Switches, Photocells and CMS nodes powered by a lamp driver.

### 2.3.5 Control equipment

These have the exact same structure as lamp codes (please see above)

**Definition of digits 1 and 2**

| Equipment Codes | Description | Comment |
|---|---|---|
| 91 | Time Switch Controllers | Load is continuous. Includes Time Switches powered by a lamp driver. |
| 92 | Thermal Photocells | Are based on 3 Watts when the lamp is switched 'OFF' and 0 Watts when lamp is switched 'ON'. |
| 93 | Hybrid Photocells | Are based on 3 Watts when the lamp is switched 'OFF' and 0 Watts when lamp is switched 'ON'. |
| 94 | Electronic Photocells | Load is continuous, covers solid state, latching relay and part night photocells, including photocells powered by a lamp driver |
| 95 | ~~Electronic Photocells (Latching relay)~~[Discontinued] | See Code 94. |
| 96 | Infra-Red Photocells | |
| 97 | ~~Electronic Photocells (Timeswitch)~~ [Discontinued] | See Code 94. |
| 98 | Electronic Controls (e.g. CMS devices) | Relates to a controller for CMS equipment. e.g. a node or telecell connected to the lamp/ballast, and including nodes and telecells powered by a lamp driver ~~to facilitate dimming and switching.~~ |
| 99 | VPSR Controls and Controls integral to Ballasts | Relates to:<br>• A standalone dimming control device (not inbuilt as part of a photocell) which also incorporates the load consumed by a separate standard photocell; or<br>• A photocell with inbuilt dimming control; or<br>• A standard photocell or timeswitch together with an 'uplift' to account for the load consumed by dimming control gear integral to the lamp ballast.<br>For more information see VPSR below |

## 3.2. Paragraph 3.2

The fourth bullet point of this paragraph details the testing arrangements where equipment operates below mains voltage. It is proposed to insert the following bullet point immediately afterwards as the fifth bullet point. The intention is to refer Charge Code applicants to the specific paragraphs that explain the test requirements for equipment powered from the auxiliary output of a lamp driver.

- If equipment other than lighting e.g. lighting controls, sensors, CCTV, etc. is powered by an auxiliary output from a lamp driver, see paragraphs 3.13 and 3.14 for details of test requirements.

### 3.3. New paragraph 3.13

A new paragraph to define the test requirements for lighting controls powered by the auxiliary output from a lamp driver.

**3.13 Charge Codes for Lighting Controls powered by lamp drivers with auxiliary output.**

Lighting controls (e.g. PECU, CMS Node, Timeswitch) taking a supply of electricity from a permanently powered lamp driver via an auxiliary output and at a voltage lower than mains voltage must be allocated circuit watts that reflect the additional power consumption that will occur at mains voltage. The lamp driver will be in "standby mode" during daylight hours. This means that the power losses that will occur in transforming the power supply to a lower voltage must also be factored into the circuit watts.

The power losses will vary dependent upon the specific lamp driver, it is estimated that 0.5 watts is a reasonable average of the power losses that will occur and will be used to uplift the circuit watts of the equipment to mains voltage.

Test results will be accepted at the operating voltage of the lighting control as specified in 3.2 of this document. The circuit watts allocated to the Control Charge Code will be the average wattage of the samples tested plus 0.5 watts, e.g. test results average 0.25W plus 0.5W uplift equals 0.75W.

It is recognised that power losses will have been included in the circuit watts for the lighting when active and to allow for that, the circuit watts of the lighting under control can be decreased by 0.5 watt.

### 3.4. New paragraph 3.14

This proposed paragraph defines the testing requirements for equipment powered by the auxiliary output from a lamp driver. Whilst other equipment such as sensors, CCTV, etc on a streetlighting column can also be powered by a lamp driver, a lighting control will already be installed with circuit watts that include an uplift to reflect the power losses.

**3.14 Charge Codes for Sensors, CCTV, etc. powered by lamp drivers with auxiliary output.**

Where equipment is powered from by an auxiliary output from a lamp driver the power losses will have been included in the circuit watt rating for the street light control (see 3.13). Test results for this equipment will be accepted based on the operating voltage of the equipment.

## 4. Recommendation

The UMSUG is invited to;

- Review the proposed redlined changes to the OID: and
- Recommend that the OID is updated to include the proposed changes.

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09 March 2022