

Application Note DCL02

WTPDCL51001I

Time/Photo control with seven-level daylight harvesting

Description

The WTPDCL51001I is a Time/Photo control unit which has been wired specifically for seven-level daylight-harvesting (DH) control. It is intended for use in bulk DH applications employing open-loop control techniques. It employs a default, Type-1 RSMDCL with power level control (see cutsheet for RSMDCL01 or RSMDCL51). Various power level commands between OFF and 100% power are sent to the entire field of DEMANDflex ballasts depending on the amount of available, natural light.

Two overrides are provided: OFF/ON and ENABLE-DH/DISABLE-DH. The OFF override has the highest priority. When selected (or scheduled) it turns the entire system OFF. If set to ON, the system either operates at a power level determined by the photo-sensor or at full intensity, depending on the status of the ENABLE-DH override. Overrides may be scheduled or activated with manual switches or occupancy sensors. Multiple switches can be wired for activating each override.

Equipment

Major components include the following:

1. One (1) pcs ULT WTPDCL51001I
2. One (1) pcs ULT WPS5527K000I photo-sensor
3. One (1) or more WR8602DGL000I 2-Wire switch (or other switches and/or occupancy sensors)
4. Coverplates for the switches (WN80301DGL000I is plastic and WN97401DGL000I is stainless steel)
5. A DCL lighting control system with DCL circuit control modules and DEMANDflex ballasts

Installation

Warning!

Mounting and power connections must be completed by a licensed electrician in compliance with national and local electrical codes. Improper installation could lead to injury, death or property damage, including fire.

Mount and make power connections according to the WTPDCL51 installation instructions.

Field Devices & Connections

The photosensor must be a WPS5527K000I. Various switches and occupancy sensors are available. The specific example provide uses the WR8602DGL000I.

An example of field connections for a photocell and switching devices are shown below on the following page.

Follow manufacturer instructions for mounting field devices. #18 AWG solid copper is recommended for all field control wiring

For the photocell, maximum run is 500ft and connection is polarity insensitive.

Consult Universal for maximum number of override devices and run length restrictions.

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Theory of Operation

The outputs of the time/photo controller, WTP-4408 (internal to the WTPDCL51) drive the RSMDC inputs (internal to the WTPDCL) based on the states of manual switches, programmed schedules and the sensed light level. Output 8 is the OFF/ON override, output 7 is the ENABLE-DH/DISABLE-DH override and outputs 1-6 are driven by the photo-sensor.

A programmed schedule will usually treat output 8 (the OFF/ON override) as the system's primary control element. It will be subjected to repeating OFF-sweeps (every two hours is typical) whenever the building is expected to be unoccupied. Active periods will start with an ON override and typically with an ENABLE-DH override (output 7). Alternatively, a DISABLE-DH override (full intensity lighting) can be used during early morning and evening hours, with ENABLE-DH reserved for the mid day-hours associated with maximum availability of natural light.

Outputs 1-6 should be perpetually enabled for photo-control. This will allow them to determine the operating level of the system whenever the ON and ENABLE-DH overrides are simultaneously active. In this case, the sensed light level will determine the amount of electrical light production as dictated by the foot-candle transition points programmed for WTP-4408 outputs 1-6.

Each of these 6 outputs has two transition points, ON and OFF (in this case, the terms ON and OFF refer to the state of the output itself, and not to the light produced by the DCL system). Programming rules are:

1. For each output, ON should be programmed to a lower foot-candle level than OFF, and
2. The OFF for each output should be programmed to a lower foot-candle level than ON for the next output

This will ensure that as sensed light increases (decreases) the output states change sequentially and trigger the RSMDC to reduce (increase) light and power in a coordinated fashion.

Finally, the response to light level changes is deliberately slow. This prevents the annoyance of abrupt responses to changing natural light conditions and inhibits nuisance shadow responses.

Consult the WTP-4408 operating manual shipped with each WTPDCL51 for programming specifics.

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Typical Field Wiring

