



Pow-R-Command™ 1000
0 – 10 Vdc Dimming Electronic Ballast Control

Technical Data TD01412039E

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 New Information



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General Description

Pow-R-Command 1000

The Pow-R-Command 1000 system is a complete network of devices that allows a facility’s electrical use to be efficiently managed. The Pow-R-Command 1000 can switch individual loads through a system network and at individual panels.

Loads can also be controlled through switch inputs (building automation systems, wall switches, etc.), software or telephone commands. See Technical Document TD142031E for more information on the Pow-R-Command 1000 system.

Universal System Controllers

The USC is the most commonly used controller in the Pow-R-Command 1000 and the Pow-R-Command 100 systems.

The USC has two functions: to communicate across the network with other Pow-R-Command controllers and to coordinate switching of lighting control devices such as Smart Breakers™ or relays.

To aid in the second function, the USC 1000 is equipped with a number of inputs and outputs:

- Eight (8) low voltage 2-wire universal inputs.
- Eight (8) low voltage 2-wire digital inputs.
- Four (4) low voltage 2-wire analog outputs.
- Eight (8) low voltage 2-wire digital outputs.
- 15 Vdc supply for external devices.

The USC100 offers the following inputs and outputs:

- Eight (8) low voltage 2-wire universal inputs.
- Four (4) low voltage 2-wire digital inputs.
- Three (3) low voltage 2-wire analog outputs.
- 15 Vdc supply for external devices.

USC 0 – 10 Vdc Dimming Electronic Ballast Control

The Dimming Electronic Ballast Control uses the analog inputs and outputs that are onboard the USC, making electronic ballast control simple. Everything is contained in one compact structure, so there is no need for additional control devices.

Each USC is capable of accepting inputs from up to eight light sensors and can control up to four groups of forty Dimming Electronic Ballasts.

Because the USC can operate as a stand-alone or a networked device, several control features are available.

Features

Stand-Alone Features

Daylight Harvesting — Daylight harvesting is the process of maintaining a set light level based on the amount of natural light in an area. As the level of natural light present increases and decreases, the amount of electric light is adjusted through dimming to sustain a set level of total light. This process is inversely proportional so, the more natural light, the less electrically produced light and visa versa.

The light level is measured by an analog light sensor and the level of voltage supplied to the ballasts is adjusted by the analog outputs on the USC.

Dimming — Dimming is the process of manually controlling the electrically produced light levels to produce desired effects. For example, one can set proper lighting for presentations or work environments. The USC can set dimming levels through internal programs written by the user.

Daylight Switching — Daylight switching is similar to daylight harvesting, but in daylight switching, the electric light level is adjusted by switching lights on and off and not by dimming each light.

The natural light level is measured by an analog light sensor. As the level of natural light increases and decreases, the USC sends signals to switch lights on and off in order to maintain the desired level. Commonly, the light level is adjusted by having 1/3 or 2/3 of the electric lights on.

Lumen Maintenance — Over time, fluorescent bulbs darken with age or become dusty and their lumen output depreciates. The sensors detect the decrease and send signals to compensate for the loss. This feature extends relamping schedules, thus saving time, energy and money.

Networked Systems Applications Features

Networked systems have all the features of stand-alone applications. In addition, networked systems contain features that greatly expand control capabilities.

Universal and Shared Light Sensors — Because each USC can communicate the status of sensors attached to it, each light sensor can control any group of ballasts connected to any USC, no matter where the USC is connected on the network. This allows for global changes of electric light levels based on a light sensor attached to one of many USCs.

Custom Graphic User Interface Screens — When multiple USCs are networked together and attached to a computer, custom graphic interface screens can be created. Each graphic interface screen can show the status of any connected group of ballasts, as well as the level of light measured by any light sensor attached to the system.

In addition, the graphic interface screens give the user the ability to remotely adjust electric light levels, schedules, and other system settings.

Manual Light Level Adjustment — Each USC has the capability of accepting inputs from isolated (“dry”) contacts located in devices such as wall switches. This gives users the ability to manually select the light levels of the area they are using.

Light Sensor Control Features

- Up to eight analog light sensor inputs.
- Light sensor output maximum 5 Vdc.
- 15 Vdc supplied to light sensor by USC.
- Maximum distance of sensor from USC is 200 feet (61 m) using 18 AWG shielded twisted pair wire.

Eaton specifies PLC Multipoint CES style light sensors, or the equivalent for use with the Dimming Electronic Ballast Control.

Light sensors are described below.

Indoor:

- Fresnel lens.
- 60 degree Cone Response.
- Sensory range of 0 to 750 Footcandles.

Outdoor:

- Hooded aperture.
- Sensor range of 0 to 750 Footcandles.

Atrium or Skylight

- Translucent dome.
- 180 degree field of view.
- Atrium sensor range 2 to 2,500 Footcandles.
- Skylight sensor range 10 to 7,500 Footcandles.

See **Figure 3** below for light sensor wiring.

See **Figure 4** on **Page 4** for networked USCs with dimming control and light sensors.

0 – 10 Vdc Dimming Electronic Ballast Control Specifications

- Maximum of four groups of dimming electronic ballasts per USC 1000.
- USC controls full range of dimming electronic ballasts.
- Maximum of four dimmable electronic ballasts when using a simple 500Ω resistor interface.
- Maximum of 40 dimming electronic ballasts per group when using the 926C161G01 Dimming Cable.
- All dimming electronic ballasts must use 0 to 10 Vdc control voltage.
- Maximum distance of 1000 feet (304.8 m) from the dimming electronic ballasts to the controller.
- Use minimum 18 AWG stranded wire.

See **Figure 2** on **Page 3** for ballast wiring.

Wiring Diagrams

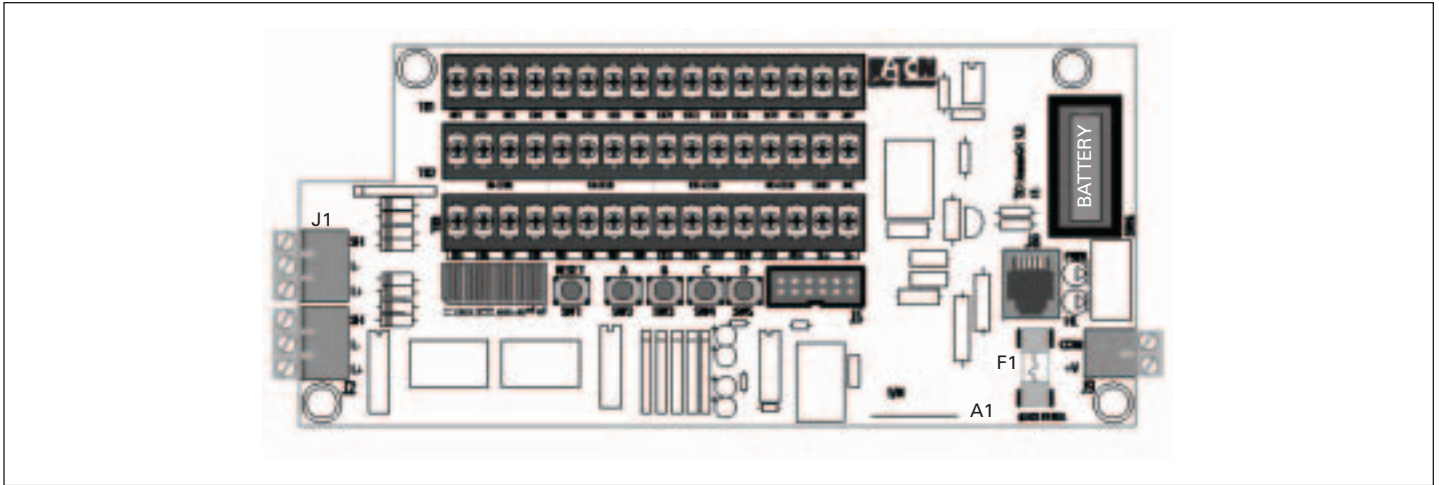


FIGURE 1. UNIVERSAL SYSTEM CONTROLLER 1000

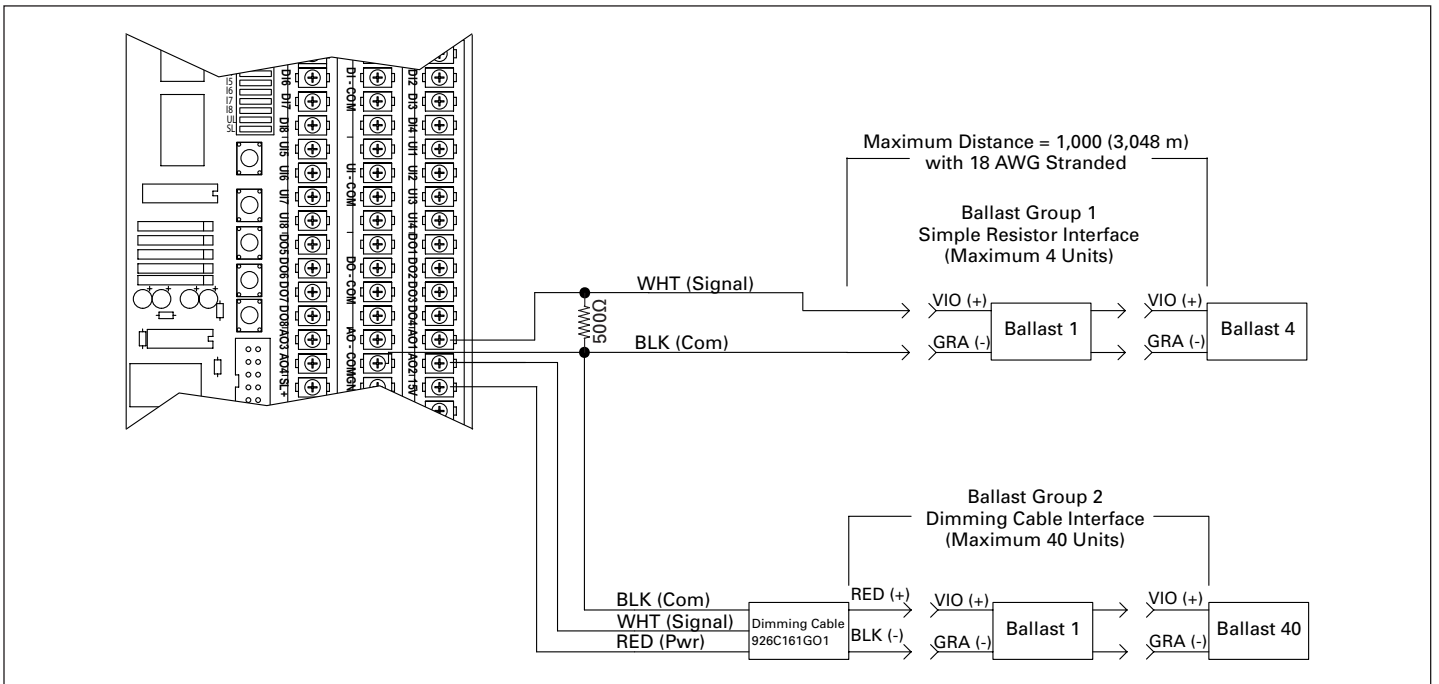


FIGURE 2. BALLAST WIRING

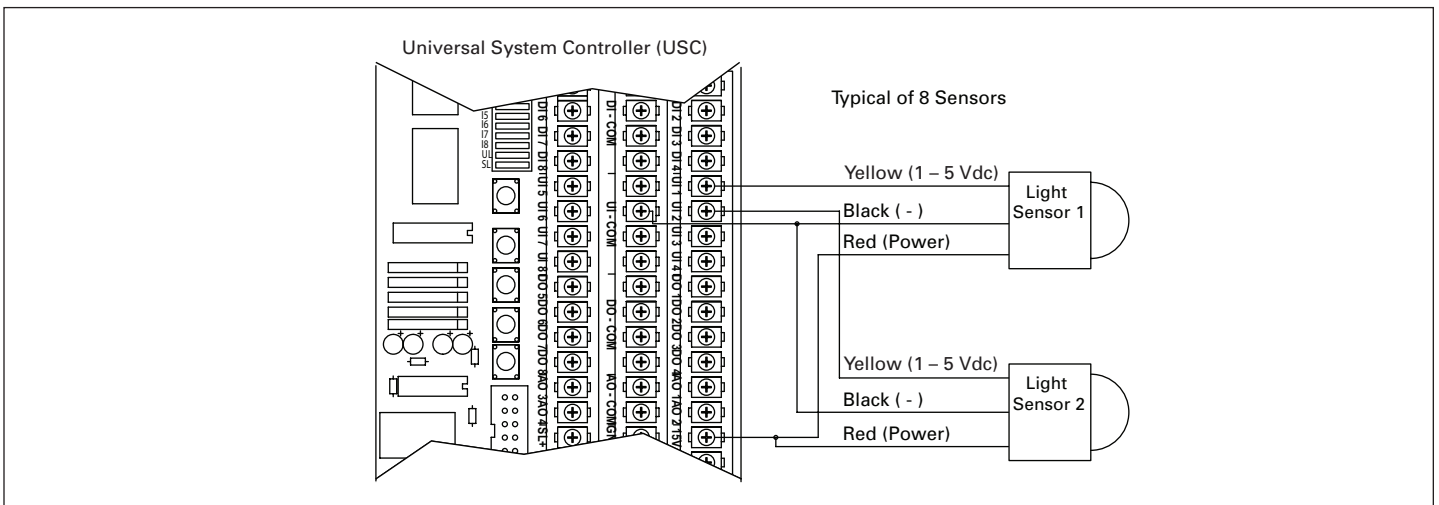


FIGURE 3. LIGHT SENSOR WIRING

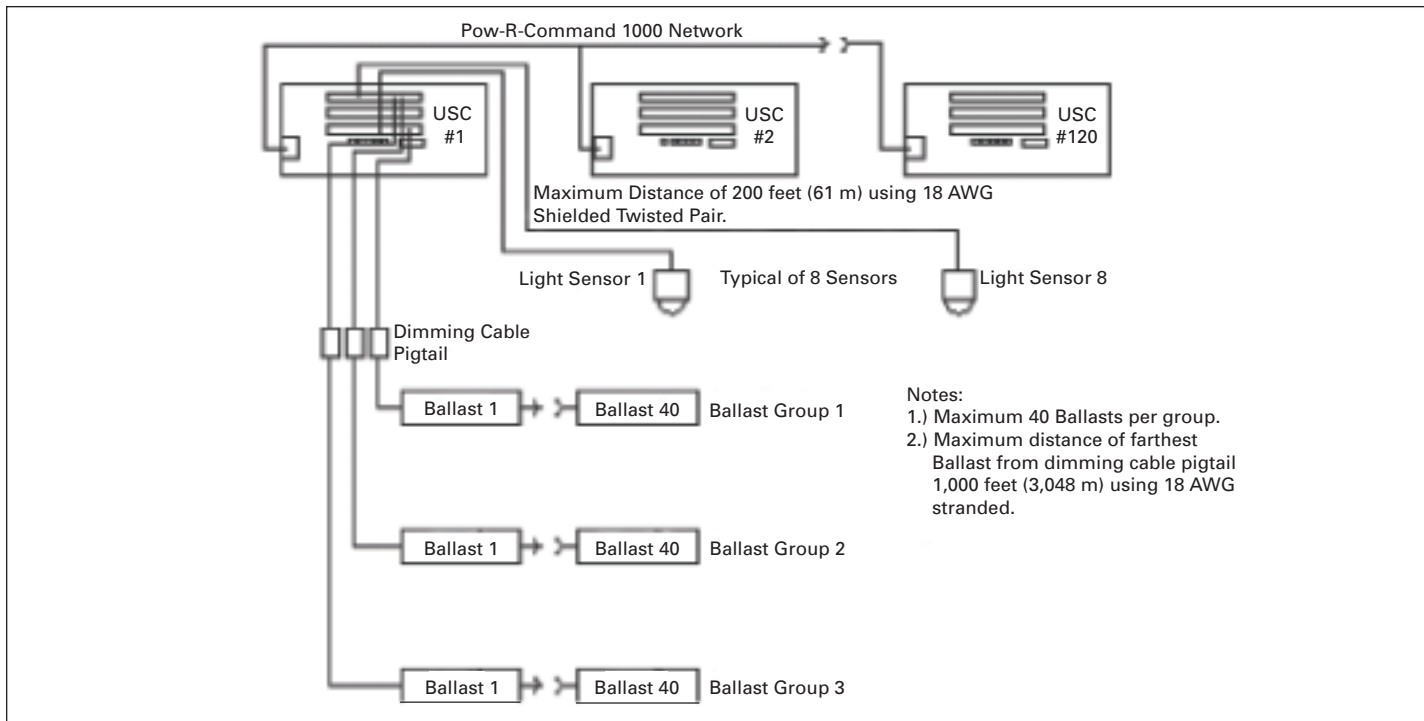


FIGURE 4. NETWORKED USC WITH 0 - 10 V DIMMING ELECTRONIC BALLAST CONTROL

Pow-R-Command Technical Resource Library

For additional information on Pow-R-Command 1000 Networks and components, please refer to the appropriate Technical Document. As of the date of this document, Technical Documents for the Pow-R-Command 1000 System are as follows:

Title	Publication Number
PRC1000 — System Overview.	TD01412031E
PRC1000 — Switch Override Controller.	TD01412032E
PRC1000 — Telephone Override Controller Product Reference.	TD01412033E
PRC1000 — Networking.	TD01412034E
PRC1000 — Lighting Optimization Software	TD01412035E
PRC1000 — Human Machine Interfaces	TD01412036E
PRC1000 — Protocol Exchanges	TD01412038E
PRC1000 — 0 - 10 Vdc Dimming Electronic Ballasts Control	TD01412039E
PRC1000 — OPC Server	TD01412040E
PRC1000 — SOAP Server	TD01412041E
PRC1000 — Custom Graphics and Data Logging.	TD01412042E
PRC1000 — Web Server Software.	TD01412043E
PRC1000 — Universal I/O Module	TD01412044E
PRC1000 — Six-Channel Relay Output Card	TD01412045E
PRC1000 — Network Signal Repeaters	TD01412046E

For the most current list of documents on the Pow-R-Command 1000 system, and available downloads, please visit www.EatonElectrical.com

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