ZEUS-L1 | SMART CONTROLLER

USER MANUAL

ZEUS-L1 | SMART CONTROLLER

PLEASE READ BEFORE INSTALLING!

The ZEUS-L1 Master Controller regulates 1000W DE and 630W CMH ballasts, providing a temperature-safety system for DE and CMH ballasts and safely controlling the turn-on and turn-off functions of bulbs.
These features reduce the strain on your ballasts and bulbs to ensure they achieve the longest life-span and best performance possible.

AFTER OPERATION, THE 1000W DE AND 630W CMH SYSTEMS REQUIRE UP TO 30 MINUTES OF COOL-DOWN TIME. TO PREVENT DAMAGE TO HOT BULBS, THE BALLASTS AND CONTROLLERS HAVE A BUILT-IN TEMPERATURE-SAFETY SYSTEM.

ONCE TURNED OFF, THE BALLASTS TAKE BETWEEN 20 SECONDS AND 5 MINUTES TO TURN BACK ON, DEPENDING ON BULB TEMPERATURE.

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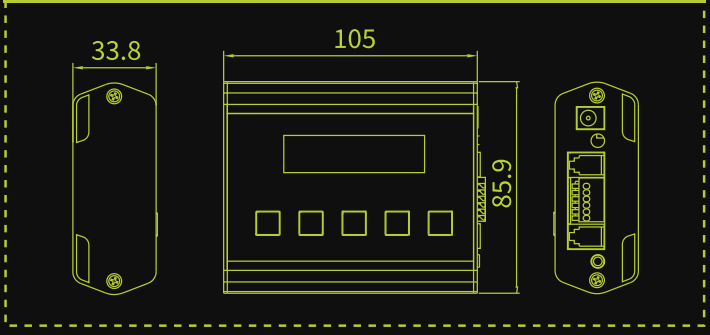
1. ZEUS-L1 MASTER CONTROLLER SPECS

Input Voltage	Adapter: 120-240V AC - 5V DC Power Adapter
Compatible Ballast Types	315W/400W/600W/630W/750W/1000W
Output Level	50-115%
Outputs	2
Temperature Sensors	2
Number of Ballasts per Output	80
Total Number of Ballasts	160
EEM Modules	2 Optional

2. DIMENSIONS

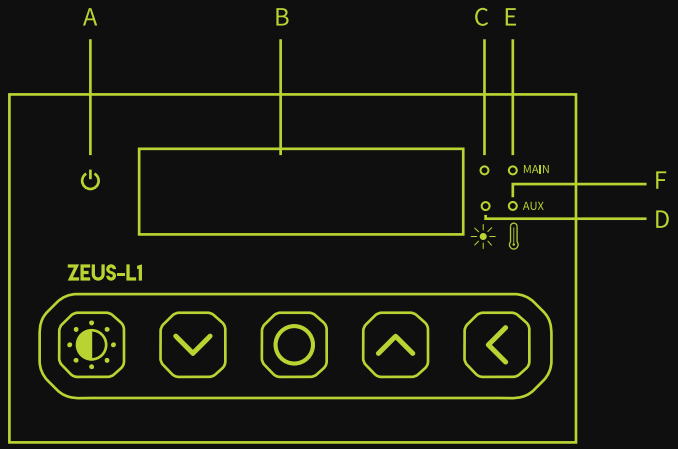
Length	105 mm	4.13"
Height	85.9 mm	3.38"
Width	33.8 mm	1.33"
Weight	170g	0.37lb



3. CONTROLS

(dimming)	Display and/or adjust output level
(v)	Navigate down in menu/lower output level
(O)	Go to menu/confirm
(^)	Navigate up in menu/raise output level
(<)	Navigate back in menu/cancel/reset

4. INDICATIONS



	Indication signal	Function
A	Power indication	A burning green light indicates controller is active. A blinking green light indicates a power interruption has occured during operation.
B	Display	Diaplays status, warnings and controller menu.
C	Light indication main	A burning blue light indicates the port is active. A blinking blue light indicates an overload/short circuit in a cable connected to the port. Blue light off indicates the port is inactive.
D	Light indication aux	
E	Temperature warning main	A burning red light indicates the auto-dim temperature has been exceeded in the past. A blinking red light indicates the auto-dim temperature threshold is currently exceeded. The corresponding output channels are being dimmed. A fast blinking red light indicates the shutdown temperature threshold has been exceeded. All output channels have been shut down.
F	Temperature warning aux	

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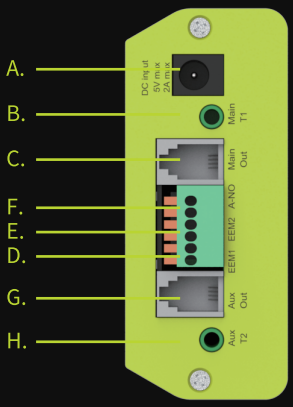
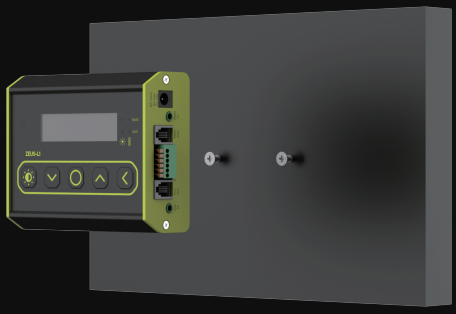
Socket Descriptions (on the side of the controller)

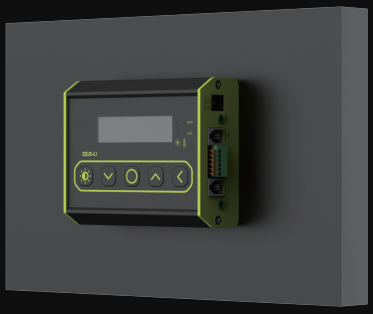
A. 5V DC input
B. 3.5 mm jack main temperature sensor (T1)
C. RJ9 main port for controlling up to 80 ballasts
D. Cage clamp connector EEM1 (output is active when main channel is on)
E. Cage clamp connector EEM2 (output is active when main channel is off)
F. Cage clamp alarm Normally Open (potential free contact)
G. RJ9 auxiliary port for controlling up to 80 ballasts
H. 3.5 mm jack auxiliary temperature sensor (T2)



5. MOUNTING THE ZEUS-L1 MASTER CONTROLLER

The ZEUS-L1 Master Controller can be wall mounted using two nails or screws. Simply install two screws or nails part way into a wall 50mm/2” apart, measuring from the center point of each screw/nail.





6. INSTALLING TEMPERATURE SENSORS

At least one temperature sensor must be installed for the controller to function. The controller uses these sensors to monitor the room's temperature and will automatically dim or turn off the lights if the temperature is too high.
Note: The controller must be connected to ONE temperature sensor when the controller is in "Follow mode"; and it must be connected to TWO temperature sensors when in "Inverse mode".

7. INSTALLING ONE TEMPERATURE SENSOR (FOR "FOLLOW MODE")

The controller uses only one of the provided temperature sensors when in "Follow mode".
• Install the controller's provided temperature sensor as close as possible to the sensor of the room's climate control system, in order to ensure both sensors are exposed to the same temperature.
• Shield the controller sensor from direct light, as direct light will cause inaccurate temperature
readings. Use a hood if necessary.
• Plug the controller temperature sensor into the "T1" jack. This will cause measured temperature to be displayed on the controller display screen.
Note: The displayed temperature may take some time to level out.
Note: In case the controller sensor cable is not long enough, it can be extended an extra 5 meters by connecting it to a standard 3.5 mm jack extension cable.
Note: If the message "sensor removed" appears, the sensor is not (fully) plugged in.
Note: If the message "sensor failure" appears, the sensor is defective and requires replacement.

8. INSTALLING TWO TEMPERATURE SENSORS (FOR "INVERSE MODE")

"Inverse mode" requires the installation of two temperature sensors, each in a separate room.
• Before installing the temperature sensors, decide which controller channel (either main or aux)
will control the lights in which room (thereby designating a "main" room and an "aux" room).

• Install one controller temperature sensor in each room, positioning them as close as possible to the sensors of the room's climate control system.
• Shield the controller sensors from direct light, as direct light will cause inaccurate temperature readings. Use a hood if necessary.
• Plug the sensor installed in the "main" room into the T1 jack on the side of the controller.
• Plug the sensor installed in the "aux" room into the T2 jack on the side of the controller.

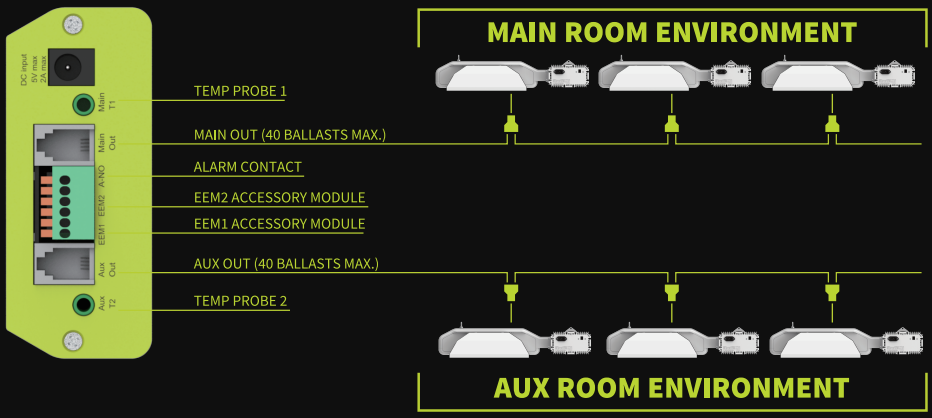
• The temperatures measured by both sensors will be displayed on the controller display screen.
Note: In case the controller sensor cable is not long enough, it can be extended an extra 5 meters by connecting it to a standard 3.5 mm jack extension cable.
Note: If the message "sensor removed" appears, the sensor is not (fully) plugged in.
Note: If the message "sensor failure" appears, the sensor is defective and requires replacement.

9. CONNECTING THE CONTROLLER TO THE BALLASTS

The two RJ9 jacks (the "main" and "aux" jacks on the side of the controller) can each be connected to up to 80 ballasts.

In order to let our ballasts be controlled by the ZEUS-L1 Master Controller, turn the control knob on each connected ballast to "EXT" (external control).

• Plug the RJ9 end of a provided controller cable into the controller's RJ9 "main" jack.
• For a two-room setup, or if there are more than 80 ballasts in the "main" room, plug the second controller cable into the RJ9 "aux" jack.
• If multiple ballasts are used, connect an RJ14 splitter and extension cables to the controller cable (at the RJ14 end), and plug the extension cables into to the desired number of ballasts.
• If multiple RJ14 splitters are required, simply connect the additional splitters to the extension cables attached to an existing splitter. Repeat this process for up to 80 ballasts per RJ9 jack.



10. CONNECTING THE CONTROLLER TO EXTERNAL EQUIPMENT MODULES (EEMS) TO CONTROL AUXILIARY EQUIPMENT

- Warning: EEMs can handle equipment with a resistive load of up to 16A. The maximum allowable current can be limited by local types of plugs (e.g. UK = 13A). Higher currents may be supported by using EEMs to trigger heavier contactors.
- Warning: To prevent over-current, always determine the maximum allowable current for your (local) cabling before connecting a load to the EEM.
- Warning: Never connect the cage clamps of the EEM to any device other than the ZEUS-L1 Master Controller.
- Warning: Never connect more then one EEM to each set of controller cage clamps.
- Warning: Ensure all wire ends are fully inserted into the cage clamps. Exposed wire endings can be dangerous!
- Caution: When in “Auto” mode, EEMs are automatically turned off following a temperature alarm, sensor failure or during a power interruption to prevent crop damage.

The controller can control up to two EEMs, enabling you to activate or deactivate auxiliary equipment. An example would be a CO2 source or a non-dimmable light you want to activate during “lights-on” periods, or heater you want activated during “lights-off” periods.

The controller is connected to each EEM by a signal cable, which is plugged into the cage clamps on the side of the controller.
Two EEMs can be plugged into the controller. The two sets of cage clamps on the side of the controller are marked “EEM1” and “EEM2”.
The device plugged into “EEM1” is turned on/off when the controller’s “main” channel is on/off: “EEM1” will turn on when “main” is on.
The device plugged into “EEM2” works the opposite way: “EEM2” will turn on when “main” is off.

11. SAFETY WHEN INSTALLING EXTERNAL EQUIPMENT MODULES

• Caution: Complete installation and connect each EEM to the controller before connecting the EEM to a power source.

12. CONNECTING EQUIPMENT FOR USE DURING LIGHTS-ON PERIODS

Example: a CO2 source, light or watering unit may be activated during lights-on periods.
• Connect the EEM to the cage clamps marked “EEM1”.
• Plug the auxiliary equipment into the female plug of the EEM.
• Plug the EEM male plug into a power source.

13. CONNECTING EQUIPMENT FOR USE DURING LIGHTS-OFF PERIODS

Example: a heater may be activated during lights-off periods.
• Connect the EEM to the cage clamps marked “EEM2”.
• Connect the auxiliary equipment to be activated during lights-off periods to the EEM connected to clamps marked “EEM2”.

14. CONTROLLING AUXILIARY EQUIPMENT IN “INVERSE MODE” (TWO ROOMS 12H/12H)

• Caution: We recommend you install and connect the EEM before plugging it into a power source.
• Two EEMs are needed for a two-room setup.
• Link one EEM to the controller cage clamps marked “EEM1” and a second EEM to the controller cage clamps marked “EEM2”.

15. CONNECTING A TEMPERATURE SHUTDOWN, SENSOR FAILURE OR POWER-OFF ALARM TO THE CONTROLLER

• Warning: The alarm feature only works in the “AUTO” mode
• Warning: The alarm contacts are rated for a maximum of 13, 5V/50mA.

16. CONNECTING AN ALARM WIRE TO THE CONTROLLER

To connect an alarm to a cage clamp, remove the wire from the alarm, split it in two and strip the ends bare. 8mm of the endings need to be stripped, and it is best if they are tinned or finished with cable end-sleeves.
• Press the white buttons above the contact openings of the cage clamps under the marking “A-NO” (but when using solid cable ends, this is not required).
• Insert both wire ends of the alarm system in separate openings; the polarity of the wires does not matter.
• Release the buttons to lock the wires in place.

17. CONNECTING THE CONTROLLER TO A POWER SOURCE

• Warning! When you first turn on the controller (by plugging it into a power source), be aware that the connected ballasts may be turned on. In order to prevent this:
a) Make sure your ballasts are not connected to a power source yet.
b) The signal cables of the ballasts are not yet inserted in the controller until the controller is connected and programmed.
• Once you are sure the ballasts will not be turned on against your wishes, plug the adapter into the AC outlet and into the controller’s DC input to turn it on.

18. SETUP INSTRUCTIONS BEFORE CONNECTING TO BALLASTS

• Caution: Before connecting the controller to any ballasts, set its output mode to “OFF” to prevent ballasts from being accidentally turned on during the controller setup process.
• After this, it is safe to either plug the ballasts into a power source or insert the signal cable to the ballasts into the controller (if the ballasts are already plugged in).
Note: After 60 seconds of inactivity, the controller interface will return to the main menu.
Note: To leave any screen without saving changes, press the “ ^ ” or ” v ” key .
• If the controller display screen indicates there is an overload, check to make sure that no cabling errors were made when connecting the RJ connectors.

19. LOCALIZING YOUR CONTROLLER

The controller can be set to five languages: Dutch, English, German, French and Spanish. To change the language:
• Press “ O ” to open the controller menu.
• Press “ ^ ” or ” v ” to select “language”, and press “ O ”.
The “language” screen will appear.
• Press “ ^ ” or ” v ” to select a language, and press “ O ” to confirm your choice and return to the main menu.

20. SETTING THE TIME AND SWITCHING CLOCK MODES

• Press “ O ” to open the controller menu.
• Press “ ^ ” or ” v ” to select “System Time”, and press “ O ”.
The “System Time” screen will appear with the “Clock Mode” indication blinking.
• Press “ ^ ” or ” v ” to switch between the 24-hour and AM/PM clock mode, and press “ O ” to confirm your choice.
After this, the “Hour” indication will start blinking.
• Press “ ^ ” or ” v ” to select the correct hour. In AM/PM mode, continue scrolling to select AM or PM, and press “ O ” to confirm.
• Use the same procedure to set the “minutes”. Press “ O ” to confirm your choice and return to the main menu.

21. SWITCH BETWEEN FAHRENHEIT AND CELSIUS

• Press “ O ” to open the controller menu.
• Press “ ^ ” or ” v ” to select “Temp Units” and press “ O ”.
The “Temperature Units” screen will appear.
• Press “ ^ ” or ” v ” to switch between Fahrenheit and Celsius. Press “ O ”
to confirm your choice and return to the main menu.

22. CALIBRATING THE TEMPERATURE SENSOR(S)

• Caution: The controller will not immediately display the correct temperature
when the sensor is plugged in: it takes some time to register temperature changes.
• Caution: To allow for accurate temperature management within the
climate room, the temperature measured by the controller must match the
temperature measured by the climate control system. If these values do not
match, the ZEUS-L1’s temperature-safety system may interfere with the climate
control system.
• Caution: Always place the temperature sensor of the controller as close as
possible to the temperature sensor of the climate control system.

If necessary, the temperature measured by ZEUS-L1 Master Controller can be
manually adjusted to match the temperature measured by the climate control system:
• Press “ O ” to open the controller menu.
• Press “ ^ ” or ” v ” to select “Calibrate”, and press “ O ”.
The “Calibration” screen will appear, displaying the temperature
measured by the main temperature sensor, “T1”, and the auxiliary
temperature sensor, “T2”. If one or both temperature sensors are not connected (or
incorrectly connected), the text “Removed” or “Failure” will be displayed beside
the corresponding temperature sensor.
• Use “ ^ ” or ” v ” to switch between “T1” or “T2” and press “ O ” select the
temperature value you wish to adjust.
• Use “ ^ ” or ” v ” to adjust the temperature to the desired value, and press “ O ”
to confirm your choice.

Note: The calibrated temperature values are stored in the internal memory
of the controller. Resetting the controller will restore these values.

23. CHANGE THE DISPLAY MODE FROM % TO WATTS

• Caution: The wattage displayed by the controller only serves as a visual aid. The displayed wattage is calculated as a percentage of the full wattage of the connected ballasts (which needs to be manually input in the contoller interface). If a 630W ballast model is selected in the controller, but a 1000W ballast is actaully connected, the ballast will still display output as “1000W” when the controller is set to 100%.
• Warning: Always use the % setting when ballasts with different wattages are used simultaneously.

By default the controller represents ballast output as a percentage of the total output. The controller can also convert this percentage into Watts if the wattage of the ballast is known. To set the wattage of the ballast model:

• Press “ O ” to open the main menu.
• Press “ ^ ” or ” v ” to select “Display Mode” and press “ O ”.
The “Display Mode” screen will appear.
• Press “ ^ ” or ” v ” to select the wattage of the ballast(s) you have connected, or select “100%” in the case you are using ballasts of mixed wattage.
• Press “ O ” to confirm your choice.
The “Main” screen and the “Output Level” screens will now display the ballast output in Watts or as a percentage, according to your selection.

24. OVERVIEW FOR SETTING UP THE CONTROLLER

• Caution: Set the controller’s output mode to “OFF” to ensure no ballasts will be accidentally activated during the controller setup.

Follow the steps listed below to quickly start using the controller:
• Set the ballast output level.
• Program a light cycle.
• Set the output mode of the controller to “follow” or “inverse”.
• Set the auto-dim temperature.
• Set the shutdown temperature.
• Set sunrise/sunset period (optional).
• Activate “AUTO” mode on the controller.

25. ADJUST BALLAST OUTPUT TO REGULATE LIGHT INTENSITY

The controller can set the output of a ballast between 50 and 115 percent. Adjusting this ballast output enables the user to change the light intensity in the climate room.

- Press " O " to open the main menu, and select "Output Level".
- Press " ^ " or " v " to set the ballast output between 50% and 115%.
- Press " O " to confirm your choice.

26. PROGRAMMING A LIGHT CYCLE

- Press " O " to open the main menu.
- Press " ^ " or " v " to select "Light Cycle" and press " O ".

The "Light Cycle" screen will appear with the hour indication beside "ON" blinking.

- Press t" ^ " or " v " to set the hour at which the lights are to be turned on, and press " O " to confirm.
- Use the same procedure to set the minute indication, as well as the time at which the lights are to be turned off.

27. SET "FOLLOW" OR "INVERSE" MODE (AUX FUNCTION)

The controller can be set to activate and deactivate all ballasts connected to it simultaneously. This mode is called the "Follow Main" mode. The controller may also be set to invert the output of its main and the auxiliary channel. This means the auxiliary channel and the ballasts connected to it are switched off when the main channel and the ballasts connected to it are switched on. An inverted light cycle may be used to alternate light between two rooms in a 12/12 hour system. Such a system may be used in the generative phase to optimize power utilization. This mode is called the "Inverse" mode.

• Caution: Always set the light cycle to 12-hour periods in “Inverse” mode.

• Press “ O ” to open the main menu.
• Press “ ^ ” or ” v ” to select “Aux Function” and press “ O ”.
The “Aux Function” screen will appear.
• Press “ ^ ” or ” v ” to switch between “Follow Main” and “Inverse”, and press “ O ” to confirm.
• In “Inverse” mode, the “Aux” channel will be off when the “Main” channel is on.
• If you choose “Inverse” mode, set the light cycle to 12-hour periods to ensure both rooms are equally lit. The selected “ON”-“OFF” period will apply to the “Main” channel; the “Aux” channel will operate in the inverse of the “Main” channel.

28. TEMPERATURE-SAFETY SETTINGS

When the temperature in a climate room gets above a certain value, crops can be negatively affected. The controller can be set to dim the lights when the temperature hits a certain value, and to turn off the lights if it reaches another temperature.

29. SETTING THE AUTO-DIM TEMPERATURE

Note: The default auto-dim temperature is set at 30 °C/86°F.
Note: The auto-dim temperature cannot be set higher than the shutdown temperature.
Note: The auto-dim function will decrease the light intensity to 50% over a span of a rise of two degrees Celsius or 3.6 degrees Fahrenheit.

• Warning: Always set the auto-dim temperature at least 2 degrees Celsius/ 3.6 degrees Fahrenheit above the temperature of the climate control system. This will prevent the controller from interfering with the climate control system.

• Press “ O ” to open the main menu.
• Press “ ^ ” or ” v ” to select “Auto-Dim Temp” and press “ O ”.
The Auto-Dim Temperature screen will appear.
• Press “ ^ ” or ” v ” to increase or decrease the target temperature, and press “ O ” to confirm.

Once the auto-dim temperature is reached, the controller will automatically start dimming the lights. No auto-dim will occur if the shutdown temperature is set at the auto-dim temperature.

Note: the auto-dim function will continue to dim the lights until the room's temperature drops to half a degree Celsius/0.9 degrees Fahrenheit under the set temperature.

30. SETTING THE SAFETY SHUTDOWN TEMPERATURE

Note: The default shutdown temperature is set at 35˚C/95˚F.
Note: The safety shutdown temperature of the controller cannot be set lower than the auto-dim temperature.

- Warning: Always set the shutdown temperature so it does not accidentally deactivate the lights.
- Warning: After a shutdown, a manual reset is required.

- Press " O " to open the main menu.
- Press " ^ " or " v " to select "Shutdown Temp" and press " O ".

The "Shutdown temperature" screen will appear.

- Press " ^ " or " v " to increase or decrease the temperature, and press " O " to confirm.

Once the shutdown temperature is reached, the controller will automatically shut down all the lights and all the equipment connected to the EEMs.
The A-NO alarm contacts will also be activated.

31. SETTING THE SUNRISE AND SUNSET PERIOD

To allow crops to adjust to either a "lights-on" or "lights-off" period, a sunrise and sunset period may be set. During this period, the light intensity increases from 50% to the desired intensity.

- Press " O " to open the main menu.
- Press " ^ " or " v " to select "Sunrise/Sunset" and press " O ".

The "Sunrise/Sunset" screen will appear.

- Press t" ^ " or " v " to increase the ramp up/down time to up to 30 minutes. Zero minutes indicates no ramp up/down time.
- Press " O " to confirm.

32. ACTIVATE OR DEACTIVATE THE LIGHTS MANUALLY OR SET AUTOMATIC MODE

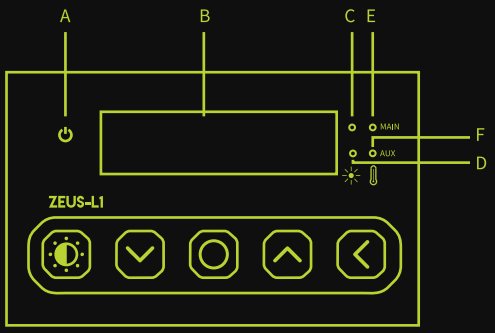
• Warning: When replacing a light, setting the ballast to “Off” to override the clock not sufficient! ALWAYS disconnect the ballast from the mains!
• Warning: When the controller’s “Output Mode” is set to “On” or “Off”, the controller’s temperature-safety features will not work.
Note: The “On” and “Off” mode are included to allow for replacement of ballasts and the testing of lamps.
• Press “ O ” to open the main menu.
• Press “ ^ ” or ” v ” to select “Output Mode” and press “ O ”.
• Press “ ^ ” or ” v ” to switch between “Auto”, “On” and “Off”, and press “ O ” to confirm.

-- “On” turns all the lights on. This setting will ignore temperature safety settings.
-- “Off” turns all the lights off.
-- “Auto” follows the programmed light cycle and activates the temperature-safety settings

33. RESETTING THE CONTROLLER TO FACTORY SETTINGS

Factory reset will return all values to factory settings and undo any changes to the calibration of the temperature sensors.
• Press “ O ” to open the main menu.
• Press “ ^ ” or ” v ” to select “Factory Reset” and press “ O ”.
The “Factory Reset” screen will appear.
• Press “ ^ ” or ” v ” to switch to “Yes” and press “ O ”.
The controller will now be reset to factory settings.

34. INTERPRETING LED SIGNALS



-GREEN LIGHT (A)

A burning green light indicates the controller is functioning.

A blinking green light indicates the power has been interrupted.
After a power failure the blinking green indicator must be reset;
Hold the reset button " < " for 3 seconds to reset the indicator.

-BLUE LIGHT (C/D)

A burning blue light indicates the ballasts connected to the "main" and/or "aux" channel are activated.

A blinking blue light indicates an overload in the main or aux channel.
When a blue light is off, it indicates the connected ballasts are deactivated.

-RED LIGHT (E/F)

A blinking red light indicates the auto-dim temperature has been exceeded
A fast blinking red indicates the shutdown temperature ha been exceeded.
A burning red light indicates the auto-dim temperature has been exceeded in the past.

35. INTERPRETING DISPLAY MESSAGES

"Sensor Disconnected":
The message "Sensor Disconnected" appears when one or two temperature sensors are not plugged in securely. All devices connected to the controller will be deactivated.
• Plug in the missing sensor to resolve.

"Sensor Failure":
If the message "Sensor Failure" appears, the sensor is defective. All devices connected to the controller will be deactivated, and the controller must be reset.
• Replace the temperature sensor.
• Hold the reset button " < " for 3 seconds.

“Controller Overload”:

If the message “Controller Overload” appears, either the “Main” or “Aux” channel of the controller has been overloaded. The blue led indicator behind the overloaded channel will also start flashing. An overload may occur when the wiring connected to the “Main” or “Aux” channel has short circuited. All devices connected to the controller will be deactivated, and the controller must be reset.

- Check which channel indicates the overload.
- Search for faulty wiring or contacts, and make replacements.

“Auto-Dim”:

When the auto-dim temperature has been exceeded, the message “auto dim” will appear on the display next to the corresponding channel. The red light will also flash. The flashing will continue until the temperature drops half a degree Celsius/ 0.9 degrees Fahrenheit below the auto-dim temperature for at least 30 seconds.
A burning red light indicates the auto-dim temperature has been exceeded in the past.

- To resolve a burning red light, hold the reset button “ < ” for 3 seconds to reset the warning.

“Temp Alarm”:

When the shutdown temperature has been exceeded, the message “Temp Alarm” will appear on the display and a red light will flash. All devices connected to the controller are deactivated. The controller must be reset.

- Ensure the temperature of the room is below the shutdown temperature. If the temperature is still above shutdown temperature, the controller cannot be reset.
- Hold the reset button “ < ” for 3 seconds to reset the controller.

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