Ballast Dimmer

INSTEON® Remote Control 0-10VDC Ballast Dimmer

Owner's Manual

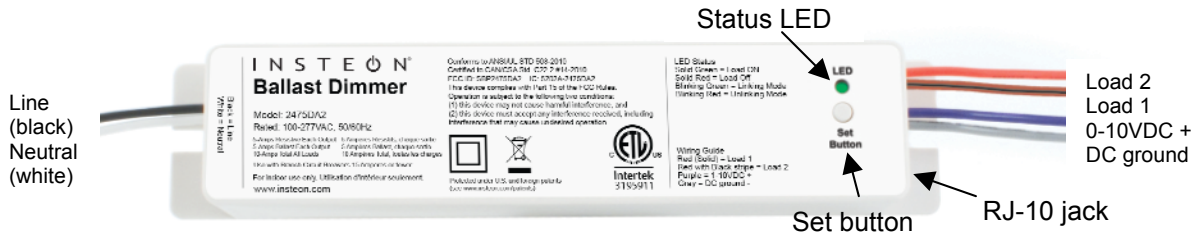2475DA2 (US)

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About Ballast Dimmer

This in-line ballast control module supports two different operational modes: dimmer and dual-relay. For use in new construction or retrofit (inside or outside the fixture) where saving energy is a priority.

RJ-10 Mini-modular jack pin-outs:

Pin 4 (Left side)	Pin 3	Pin 2	Pin 1	Group 1: triggers when switch between pin 3 & 4 is closed Group 2: triggers when switch between pin 3 & 4 is opened
Ground	Group 1 - 2	Group 3-4	12-15VDC	Group 3: triggers when switch between pin 2 & 4 is closed Group 4: triggers when switch between pin 2 & 4 is opened

Features and Benefits

- Controls dimmable ballasts with 0-10VDC input
- Dual-relay load output offers control of two non-dimmable ballasts up to 5A each
- Supports 100VAC to 277VAC
- 50/60Hz (auto-detect) for international compatibility
- Beeper for setup ease
- All settings stored in stable memory, even through power outages
- Two year warranty

In the Box	Tools Needed	Optional Accessories
Ballast Dimmer	Slotted screwdriver	Keypad Dimmer
Quick Start Guide	Phillips screwdriver	Dimmer Switch
Mounting Screws	Wire cutter/stripper	INSTEON Hub
Two extra INSTEON ID labels	Voltage meter	Mini Remote

Getting Started

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Map out the wall switch and load that you are going to remotely operate. Keep in mind that you are going to replace the existing wall switch with a keypad or another INSTEON controller where both are wired to the same constant hot line using the existing wiring.

Installing Ballast Dimmer

CAUTIONS AND WARNINGS

Read and understand these instructions before installing and retain them for future reference.

This product is intended for installation in accordance with the National Electric Code and local regulations in the United States or the Canadian Electrical Code and local regulations in Canada. Use indoors only. This product is not designed or approved for use on power lines other than 100VAC- 277VAC 50/60Hz, single phase. Attempting to use this product on non-approved power lines may have hazardous consequences.

- Use only indoors or in an outdoor rated box
- Use with Branch Circuit Breakers 15 Amps or fewer
- Be sure that you have turned off the circuit breaker or removed the fuse for the circuit you are installing this product into. Installing this product with the power on will expose you to dangerous voltages.
- Connect using only copper or copper-clad wire
- This product may feel warm during operation. The amount of heat generated is within approved limits and poses no hazards. To minimize heat buildup, ensure the area surrounding the rear of this product is as clear of clutter as possible.
- Each INSTEON product is assigned a unique INSTEON ID, which is printed on the product's label.
- To reduce the risk of overheating and possible damage to other equipment, do not use this product to control loads in excess of the specified maximum(s) or, install in locations with electricity specifications which are outside of the product's specifications.

Identifying the Electrical Wires in Your Home (North America only)

- Line: usually black (may also be called hot, live or power), carries 120VAC electricity into the wall box
- Neutral: usually white or white wire bundle, commonly daisy-chained from box to box
- Load: usually black, from a separate cable jacket
- Ground: bare copper wire or metal fixture (if grounded)

Identifying the Electrical Wires in Your Home (Europe/Australia/New Zealand)

- As wire colors vary from country to country, make sure you always check your electrical wires with a voltage meter to correctly identify line, load, neutral and ground wires
- If you have any questions, consult an electrician or your electricity supplier to learn more about your country's wiring colors and labels
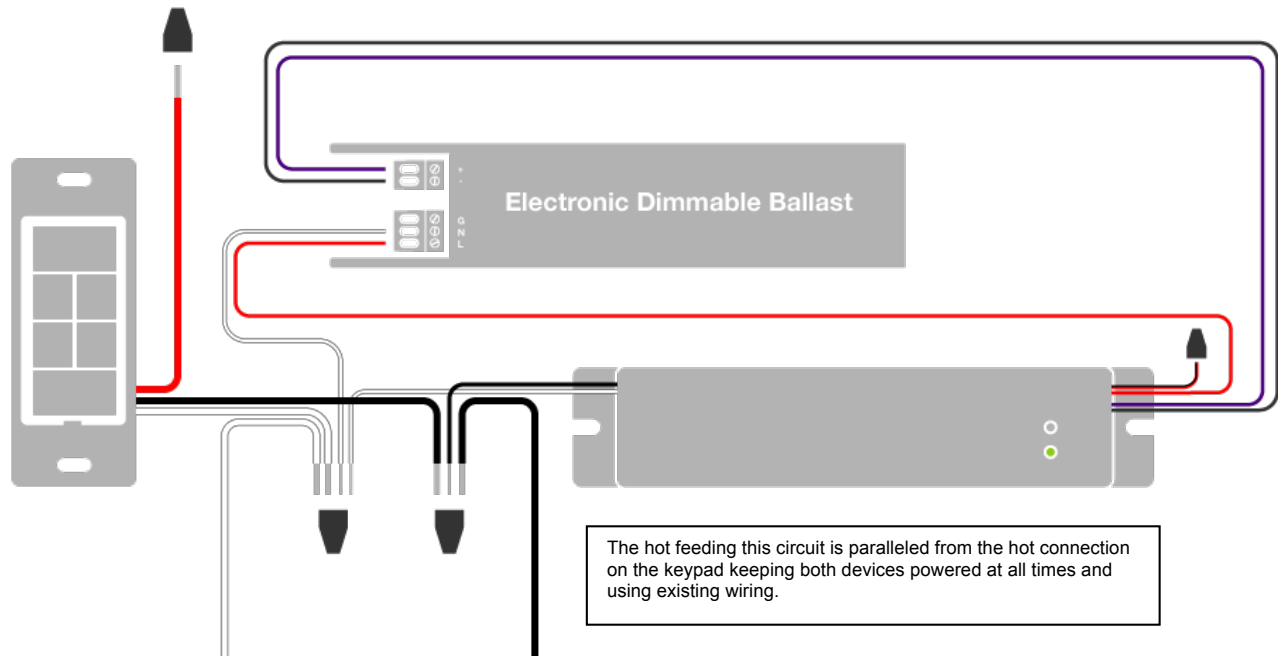
IMPORTANT!
If you have any difficulties or questions, consult an electrician. If you are not knowledgeable about, and comfortable with, electrical circuitry, you should have a qualified electrician install the product for you.

Install Ballast Dimmer for Dimmable Ballast
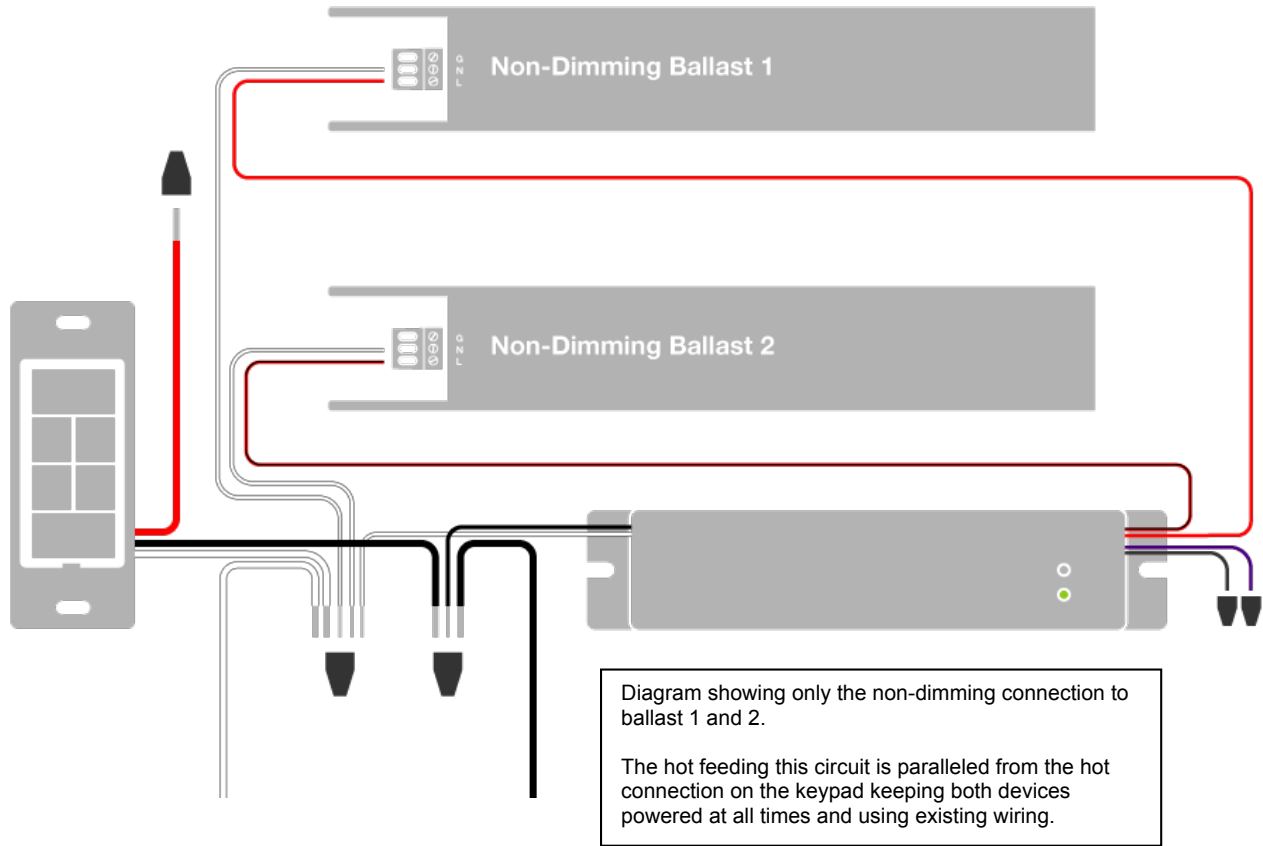
Note: use with branch circuit breakers 15 Amperes or fewer.

1) Write down the INSTEON ID found on the front of the unit (XX.XX.XX)

2) Turn off breaker/fuse and verify that the power is off

3) Disconnect wires from existing switch

4) Connect wires per diagram.

5) At the ballast location, disconnect the wires from the fixture you will be controlling and ensure that you have ½ inch of bare wire on the ends

6) See the diagram to identify and connect the line, load, neutral DC(+) and DC(-) wires on Ballast Dimmer. Be sure you have correctly identified the wires in the junction box before connecting them.

7) After ensuring wires are firmly connected and that there is no exposed wire, turn on breaker/fuse

   After a few seconds, load will turn on

8) Test Ballast Dimmer connection by tapping set button a couple times

   Ballast Dimmer load will respond appropriately

9) Link Ballast Dimmer to your INSTEON keypad or other INSTEON controller. See Make Ballast Dimmer a Responder.

10) Gently place Ballast Dimmer into the fixture box, making sure nothing could accidentally press the set button

11) Reinstall the fixture

12) Use the included INSTEON ID stickers to keep track of the modules location

Electronic Dimmable Ballast

The hot feeding this circuit is paralleled from the hot connection on the keypad keeping both devices powered at all times and using existing wiring.

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Installing Ballast Dimmer in Dual-Relay Mode

1) Write down the INTEON ID found on the front of the unit (XX.XX.XX)
2) Turn off breaker/fuse and verify that the power is off
3) Disconnect wires from existing switch
4) Connect the wires per diagram
5) At the ballast location, disconnect the wires from the fixture you will be controlling and ensure that you have ½ inch of bare wire on the ends
6) See the diagram to identify and connect the line, load 1, load 2 and neutral wires on Ballast Dimmer. Be sure you have correctly identified the wires in the junction box before connecting them.
7) Place wire nuts on the unused gray and purple wires
8) After ensuring wires are firmly connected and that there is no exposed wire, turn on breaker/fuse
   After a few seconds, load will turn on

9) Change to dual relay mode:
   a. Press and hold set button until it beeps
      LED will start blinking green

   b. Tap set button twice
      Ballast Dimmer will beep once and LED will stop blinking

10) Test the Ballast Dimmer connection by tapping set button a couple times
11) Link Ballast Dimmer to your INSTEON keypad or other INSTEON controller. See Make Ballast Dimmer a Responder.
12) Gently place Ballast Dimmer into the fixture box, making sure nothing could accidentally press the set button
13) Reinstall the fixture
14) Use the included INSTEON ID stickers to keep track of the modules location

Non-Dimming Ballast 1

Non-Dimming Ballast 2

Diagram showing only the non-dimming connection to ballast 1 and 2.

The hot feeding this circuit is paralleled from the hot connection on the keypad keeping both devices powered at all times and using existing wiring.
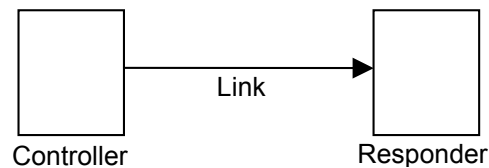
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INSTEON Setup

Some products have subtle differences in their setup procedures. Please refer to the other devices' owner's manuals for details.

INSTEON Controllers, Responders and Links

Let's define a few terms.

• The INSTEON "transmitter" is called a **controller**

• The INSTEON "receiver" is called a **responder**

• The association between the controller and responder is called a **link**

Please note that a link is one way. If you wish to have control "the other way," simply repeat link setup process "the other way." Most INSTEON devices can store hundreds of links. Furthermore, a controller can simultaneously control from 1 to hundreds of responders using what are called groups and scenes. Each link can have its own properties (e.g. 50% brightness at a 4-second ramp rate).

Make Ballast Dimmer a Responder

Follow the steps below to create a link, enabling another INSTEON device to control Ballast Dimmer.

1) Use Ballast Dimmer set button to set the load to the state you wish to activate from the controller (turn it on if you wish it to be on when the controller activates the scene, etc.)
2) Press and hold the scene controller button until it beeps[1]
3) Press and hold Ballast Dimmer set button until it double-beeps
   Controller will double-beep[2] and LED will stop blinking
4) Test by tapping controller button on and off
   Load connected to Ballast Dimmer will respond appropriately
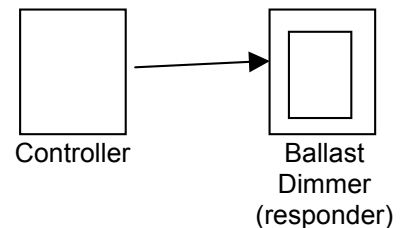
Note:
- If you wish Ballast Dimmer load to be off when the link is activated (such as for an "all off" scene), turn the load off in step #2

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[1] If the controller does not have a beeper, wait until its LED begins blinking
[2] Most models

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Changing Operating Modes (Dimmer or Switch)

Relay Mode:

By default, the Ballast Dimmer comes in Dimmer mode. Use the Relay mode for use with non-dimmable ballasts. Ballast Dimmer provides two relays to control individual ballasts or a multi-state ballast light fixture. In the multi-state ballast light fixture, either half could be off or on allowing brightness at 0%, 50%, and 100%. This mode also allows a form of course dimming as a combination of the relays: Off = both open, 50% = 1 closed/1 open, 100% = both closed.

To change to relay mode, follow these steps:

1) Press and hold set button until it beeps
      LED will start blinking green
2) Quickly tap the set button twice
      Ballast Dimmer will beep once and LED will stop blinking

Dimmer Mode:

Used with dimmable ballasts that dim based on a DC control signal that ranges from 0 to 10 V DC. When the dimmer goes down to a preset voltage, the load control relay will open removing power from the load (turning ballast off entirely). To change back to Dimmer Mode, follow these steps:

1) Press and hold set button until it beeps
      LED will start blinking green
2) Quickly tap the set button three times
      Ballast Dimmer will double-beep and LED will stop blinking

To determine current operation mode, tap Ballast Dimmer set button 4 times:
   • Red, Green, Red, Green = Dimmer Mode
   • Red, Green, Green, Green = Relay Mode

Scenes

INSTEON scenes allow a controller to conveniently adjust multiple responders to any number of desired levels, all simultaneously. Software is recommended when setting up and maintaining scenes, especially larger scenes.

Create a scene with 1 controller and Ballast Dimmer as a member

1) Press and hold controller button until it beeps
      Controller LED will start blinking
2) Tap controller set button
      Controller LED will start double-blinking
3) Tap Ballast Dimmer on and adjust to desired scene state
      Ballast Dimmer LED will turn green
4) Press and hold Ballast Dimmer set button until it double-beeps
5) For each additional scene member
      a. Adjust member to desired scene brightness/state
      b. Press and hold set button until it double-beeps
6) Press and hold controller set button until it double-beeps
      Controller LED will stop blinking
7) Test by tapping controller button on and off
      Ballast Dimmer and other scene responders will all respond appropriately

X10 Setup

Ballast Dimmer ships with no X10 address assigned.

Add X10 Address

1) Press and hold set button until it beeps
   LED will start blinking green
2) Send the desired X10 address (plus on if desired) 3 times (e.g. send B5, BON, B5, BON, B5, BON)
   Ballast Dimmer will double-beep and LED will stop blinking
3) Test by sending X10 on and off commands
   Load will turn on and off

Remove X10 Address

1) Press and hold set button until it beeps
   LED will start blinking green
2) Press and hold set button until it beeps
   LED will start blinking red
3) Send any X10 address (plus on if desired) 3 times (e.g. send B5, BON, B5, BON, B5, BON)
   Ballast Dimmer will double-beep and LED will stop blinking
4) Test by sending the old X10 address on and off commands
   Ballast Dimmer will not respond

Advanced Setup

Make Ballast Dimmer a Controller

Note: you must perform these steps before reinstalling.

1) Press and hold Ballast Dimmer set button until it beeps

   Ballast Dimmer LED will start blinking green
   You will have four minutes to complete the next steps before linking mode times out
2) Adjust responder to desired state[1]
3) Press and hold responder set button until it double-beeps

   Ballast Dimmer will double-beep and its LED will stop blinking[2]
4) Test link by tapping or pressing and holding Ballast Dimmer on/off buttons to turn on/off or brighten/dim
   Responder will respond appropriately

Remove Ballast Dimmer as a Responder

If you no longer want a controller button to control Ballast Dimmer follow these directions. Note**:** If you ever wish to un-install Ballast Dimmer, it is important that you remove all Ballast Dimmer responder links. Otherwise, controllers will retry commands repetitively, creating network delays.

1) Press and hold controller button until it beeps[3]
   LED will start blinking green
2) press and hold controller button until it beeps a second time
   LED will start blinking red
3) Press and hold Ballast Dimmer set button until it double-beeps
   Controller LED will stop blinking
4) Test by tapping controller button on and off
   Ballast Dimmer will no longer respond

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[1] If responder is a multi-scene device such as a keypad, tap scene button you wish to control until the LED is in the desired scene state (on or off).
[2] If either controller or responder LED continues blinking, the addition failed. Tap device's set button until LED stops blinking and try linking again.
[3] For devices without beepers hold until its LED begins blinking (this may take 10+ seconds)

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Remove Ballast Dimmer as a Controller

If you no longer want Ballast Dimmer to control another device (or are removing Ballast Dimmer) it is important that you follow the instructions below for each responder.

1) Press and hold Ballast Dimmer set button until it beeps
   LED will start blinking green
2) Press and hold Ballast Dimmer set button until it beeps a second time
   LED will start blinking red
3) Press and hold responder set button until it double-beeps (or LED blinks)
   Ballast Dimmer will double-beep and LED will stop blinking
4) Test by tapping Ballast Dimmer on and off
   Responder will not respond

Factory Reset

NOTE: All settings and scenes will be erased

1) Disconnect Ballast Dimmer from power for about 10 seconds
2) While holding down the set button, reconnect power to Ballast Dimmer, making sure not to let go of the set button
   Ballast Dimmer will beep and the status LED will turn on solid green
3) Continue to hold down the set button for 3 seconds and then release
   Ballast Dimmer will double-beep and the load will turn on

Restoring Power

Ballast Dimmer stores all of its settings, such as links to other INSTEON devices, with non-volatile memory. Because settings are saved in this non-volatile memory, they will not be lost in the event of a power failure.
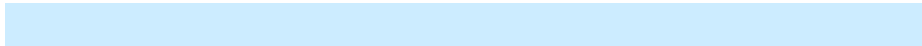
In the event of a power loss Ballast Dimmer will automatically return the load to the state it had before power was interrupted.

Specifications

General	
Product Name	Ballast Dimmer Relay – INSTEON Remote Control Ballast Dimmer On/Off Switch (Dual-Band)
Brand	INSTEON
Manufacturer Product Number	2475DA2 (US) 2446-422 (EU) 2446-522 (AUS/NZ)
UPC	813922011425 (US) 813922012897 (EU) 813922012903 (AZ)
Patent Number	7,345,998 US, International Patents Granted and Pending
Warranty	2 Years, Limited

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INSTEON ID	1	
INSTEON	400 responder groups and 1 controller group	
Maximum Scene Memberships	400 (Combined Controller + Responder)	
INSTEON Device Category	0x01 Dimmable Lighting Control (All Frequencies)	
INSTEON Device Subcategory	2475DA2 (915MHz	0x25
	2446-422 (869MHz)	0x3D
	2446-522 (921MHz)	0x3E
Load brightness levels	32 locally (256 with software)	
Status LED	Green when load is on, red when load is off	
LED brightness	Adjustable, from off to bright via software	
Local on-level (Dimming Mode)	Adjustable, 32 fixed brightness levels or resume dim	
Local ramp-rate (Dimming Mode)	Adjustable from 0.1 seconds to 9 seconds locally (0.1 seconds to 9 minutes via software)	
Local control	Yes	
Commands supported as controller	On	
Commands Supported as responder	On	Off
	Fast-on	Fast-off
	Begin bright	Begin dim
	End bright	End dim
	Incremental bright	Incremental dim
Software Configurable	Yes	
RF Range	Up to 50 meters open air	
Phase detect beacon	Yes	

X10 Support	Yes
X10 Addresses	Any 1 of 256 (unassigned by default)

Mechanical	
Mounting	Behind switch or outlet, or above light fixture in a single-gang electrical box
Wires	Analog + 0-10V Control (Gray wire)
	Analog - 0-10V Control (purple wire)
	Line
	Neutral
	Load 1
	Load 2
Set Button	1
Beeper	Yes
Beep on button press	Optional (off by default)
LED	1, green/red
Dimensions	171mm (wide), 30mm (high), 35mm (deep)
	6.75-in. (wide), 1.2-in. (high), 1.4-in. (deep)
Weight	5.1 ounces
Operating Environment	Indoors
Operating Temperature Range	32º F – 104º F (0º C – 40º C)
Operating Humidity Range	0-90% relative humidity, non-condensing
Storage conditions	-4º F to +158º F (-20º C – 70º C)
Case Color	White
Plastic	UV stabilized polycarbonate

Electrical				
Voltage	100-277VAC ±10%			
Frequency	50Hz/60Hz			
Maximum Load	0-10VDC for connection to dimmable ballast			
	Load 1; 100 to 277VAC / 5Amps			
	Load 2; 100 to 277VAC / 5Amps			
Hardwired remote control	RJ-10 Mini-modular jack four conductor			
Hardwire port wiring	Pin 4 (Left side)	Pin 3	Pin 2	Pin 1 (Right side)
	Ground	Group 1 - 2	Group 3-4	12-15VDC
Hardwire port triggering	Group 1: triggers when switch between Pin 3 & 4 is closed Group 2: triggers when switch between Pin 3 & 4 is opened Group 3: triggers when switch between Pin 2 & 4 is closed Group 4: triggers when switch between Pin 2 & 4 is opened			
Retains all settings without power	Yes, saved in non-volatile EEPROM			
Load Type(s)	Wired in ballasted dimming and non-dimming lighting loads			
Retains all settings without power	Yes, saved in Non-volatile EEPROM			
Standby power consumption	< 1 watt			

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Safety Approved	ETL, CE, C-Tick
Certifications	FCC 15.107, 15.109, 15.249
	RSS 210
	EN 300 220-2, 301 489-3
	AS/NZS 4268, CISPR 22
	UL 508
	CSA C22.2#14
	IEC 60669-2-1
FCC ID	SBP2475DA2

Troubleshooting

Problem	Possible Cause	Solution
The Status LED on Ballast Dimmer is not turning on and won't control the load.	Ballast Dimmer may not be getting power.	Make sure the circuit breaker(s) are turned on.
		Check the junction box wires to ensure all connections are tight and no bare wires are exposed.
Ballast Dimmer won't add to a scene or work with a Controller.	The Controller might have been reset without removing Ballast Dimmer from the scene.	Re-add Ballast Dimmer to the Controller scene.
	The INSTEON signal may be too weak.	Add additional INSTEON devices or move around existing INSTEON devices. All INSTEON devices act as INSTEON network repeaters.
	Large appliances, such as refrigerators or air conditioners, may be producing electrical noise on the powerline.	Install a powerline noise filter to filter electrical noise and minimize signal attenuation.
	Other electrical devices, such as computers, televisions, or power strips, may be absorbing the INSTEON signal.	
Ballast Dimmer is taking a long time to respond to a Controller.	The Controller may be sending commands to a responder that is no longer in use. Commands for the unused responder are being resent and delaying the signal.	Remove any unused responders from the Controller scene. HINT: If you are using home automation software, you can easily check scene membership and remove devices that are no longer in use.
		If the above doesn't work, perform a factory reset on the Controller.
The load turned on by itself.	Another Controller or timer could have triggered Ballast Dimmer.	Factory reset Ballast Dimmer. See _Resetting Ballast Dimmer to its Factory Default Settings_.
The Controller can turn off Ballast Dimmer but Ballast Dimmer does not turn on when I send an ON command from the Controller.	Ballast Dimmer may be added to the scene in its off state.	Re-add Ballast Dimmer to the Controller scene, while the load is on. See _Adding Ballast Dimmer to a scene as a responder_.
Ballast Dimmer is locked up.	A surge or excessive noise on the powerline may have glitched it.	Temporarily remove power from Ballast Dimmer, usually by opening the breaker feeding it.
		If the above doesn't work, perform a factory reset. See _Resetting Ballast Dimmer to its Factory Default Settings._

If you have tried these solutions, reviewed this Installation and Programming Guide, and still cannot resolve an issue you are having with Ballast Dimmer, please call 866-243-8022

Phase Bridge Detect Beacon/RF Range Test

Ballast Dimmer automatically bridges the electrical phases in your home (via communications with other dual-band devices on the "other phase"). This is only important in 2-phase homes with powerline-only INSTEON products or buildings with both 2- and 3- phase circuits. The phase bridge detect beacon can also be used as an RF range test to

see if your devices are within communication range. You will need at least one other INSTEON dual-band device installed.

1) Start Phase Bridging Detection Mode by tapping the set button on Ballast Dimmer four times, quickly
   Ballast Dimmer will begin beeping continuously and the status LED will be solid green
2) Check the LED behavior of your other dual-band devices to see if they are on the opposite phase
   If at least one of your other dual-band device LEDs is blinking green or is bright solid white or blue, the device is on the opposite phase.

   If none of your dual-band devices exhibit the behavior above, they are on the same electrical phase. Try one or both of the following:
   - *Move a dual-band device to another location until it exhibits the desired behavior*
   - *Follow steps 2 and 3 with your other dual-band devices to see if they are bridging the phases*

3) Tap the set button on Ballast Dimmer to exit Phase Bridging Detection mode
   Ballast Dimmer will stop beeping and the status LED will remain solid green if the load is on or turn solid red if it is off

Certification and Warranty

Certification
This product has been thoroughly tested by Intertek - ETL SEMKO, a nationally recognized independent third-party testing laboratory. The North American ETL Listed mark signifies that the device has been tested to and has met the requirements of a widely recognized consensus of U.S. and Canadian device safety standards, that the manufacturing site has been audited, and that the manufacturer has agreed to a program of quarterly factory follow-up inspections to verify continued conformance.

FCC and Industry Canada Compliance Statement
This device complies with FCC Rules Part 15C and Industry Canada RSS-210 (Rev. 8). Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorise aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radiolectrique subi, mme si le brouillage est susceptible d'en compromettre le fonctionnement.

The digital circuitry of this device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15.107 and 15.109 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio and television reception. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause such interference, which can be verified by turning the device off and on, the user is encouraged to eliminate the interference by one or more of the following measures:
   - Re-orient or relocate the receiving antenna of the device experiencing the interference
   - Increase the distance between this device and the receiver
   - Connect the device to an AC outlet on a circuit different from the one that supplies power to the receiver
   - Consult the dealer or an experienced radio/TV technician
WARNING: Changes or modifications to this device not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Limited Warranty
Seller warrants to the original consumer purchaser of this product that, for a period of two years from the date of purchase, this product will be free from defects in material and workmanship and will perform in substantial conformity to the description of the product in this Owner's Manual. This warranty shall not apply to defects or errors caused by misuse or neglect. If the product is found to be defective in material or workmanship, or if the product does not perform as warranted above during the warranty period, Seller will either repair it, replace it, or refund the purchase price, at its option, upon receipt of the product at the address below, postage prepaid, with proof of the date of purchase and an explanation of the defect or error. The repair, replacement, or refund that is provided for above shall be the full extent of Seller's liability with respect to this product. For repair or replacement during the warranty period, call the INSTEON Support Line at 866-243-8022 with the Model # and Revision # of the device to receive an RMA# and send the product, along with all other required materials to:

INSTEON
ATTN: Receiving
16542 Millikan Ave.
Irvine, CA 92606-5027

Limitations
The above warranty is in lieu of and Seller disclaims all other warranties, whether oral or written, express or implied, including any warranty or merchantability or fitness for a particular purpose. Any implied warranty, including any warranty of merchantability or fitness for a particular purpose, which may not be disclaimed or supplanted as provided above shall be limited to the two-year of the express warranty above. No other representation or claim of any nature by any person shall be binding upon Seller or modify the terms of the above warranty and disclaimer.
Home automation devices have the risk of failure to operate, incorrect operation, or electrical or mechanical tampering. For optimal use, manually verify the device

state. Any home automation device should be viewed as a convenience, but not as a sole method for controlling your home.

In no event shall Seller be liable for special, incidental, consequential, or other damages resulting from possession or use of this device, including without limitation damage to property and, to the extent permitted by law, personal injury, even if Seller knew or should have known of the possibility of such damages. Some states do not allow limitations on how long an implied warranty lasts and/or the exclusion or limitation of damages, in which case the above limitations and/or exclusions may not apply to you. You may also have other legal rights that may vary from state to state.