

RSQ All-Purpose Square Lens LED Modules

Dimming Guide and Step-down Transformer Application Note

HALO

The RSQ LED Series provides continuous dimming with reverse or forward phase cut dimmers.

RSQ4

RSQ4089271EMWWB
RSQ4089301EMWWB
RSQ4089351EMWWB
RSQ4089401EMWWB
RSQ4089FS1EMWWB

RSQ5

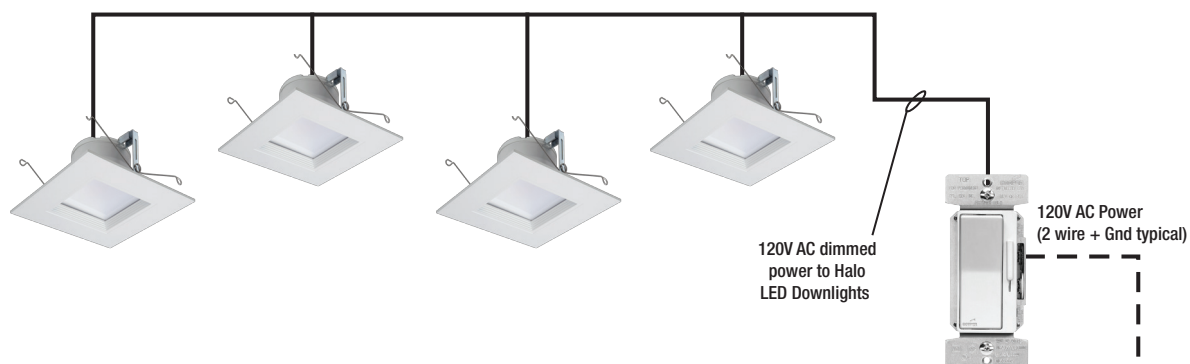
RSQ5089271EMWWB
RSQ5089301EMWWB
RSQ5089351EMWWB
RSQ5089401EMWWB
RSQ5089FS1EMWWB

RSQ6

RSQ6089271EMWWB
RSQ6089301EMWWB
RSQ6089351EMWWB
RSQ6089401EMWWB
RSQ6089FS1EMWWB



Phase Control Dimming



Compatible Dimmers

| Dimmer Make | Dimmer Series | Dimmer Model # | Minimum Luminaires (per circuit) | Maximum Recommended Luminaires (per circuit) | Min Dimming percentage (%) | Max Dimming percentage (%) | Low End Start Time |
|-------------|----------------------------------|---|----------------------------------|--|----------------------------|----------------------------|--------------------|
| Lutron | Diva | C-L wall-mount dimmers (T8, T9) | 1 | 15 | 10% | 98% | <1s |
| Lutron | Skylark | C-L wall-mount dimmers (T8, T9) | 1 | 15 | 10% | 98% | <1s |
| Lutron | Skylark Contour | C-L wall-mount dimmers (T8, T9) | 1 | 15 | 10% | 98% | <1s |
| Lutron | Ariadni / Toggler | C-L wall-mount dimmers (T8, T9) | 1 | 15 | 10% | 98% | <1s |
| Lutron | Lumea | C-L wall-mount dimmers (T8, T9) | 1 | 15 | 10% | 98% | <1s |
| Lutron | RadioRA 2 | RRD-10ND | 1 | 15 | 8% | 98% | <1s |
| Lutron | HomeWorks QS | HQRD-10ND | 1 | 15 | 8% | 98% | <1s |
| Lutron | RadioRA 2 | RRD-6NA | 1 | 15 | 10% | 98% | <1s |
| Lutron | Maestro Wireless | MRF2-6ELV | 1 | 15 | 10% | 98% | <1s |
| Lutron | HomeWorks QS | HQRD-6NA | 1 | 15 | 10% | 98% | <1s |
| Lutron | HomeWorks | HxD-6ND | 1 | 6 | 9% | 97% | <1s |
| Lutron | Stanza | SZ-6ND | 1 | 6 | 9% | 97% | <1s |
| Lutron | Power Modules | PHPM-PA with Grafik Eye QS Main Unit | 1 | 105 | 10% | 99% | <1s |
| Lutron | Power Modules | PHPM-WBX with 3-wire fluorescent control | 1 | 105 | 10% | 99% | <1s |
| Lutron | Panel Module | HW/LP-RPM-4A-120 | 1 | 104 | 10% | 99% | <1s |
| Lutron | Panel Module | HW/LP-RPM-4U-120 | 1 | 30 | 9% | 99% | <1s |
| Lutron | Grafik QS/Wallbox Power Module | "Grafik Eye QS Main Unit Family/ LQRJ-WPM-6P" | 1 | 30 | 10% | 100% | <1s |
| Lutron | Panel Module | GP (Harrier) Card | 1 | 30 | 9% | 99% | <1s |
| Lutron | Grafik Eye 3000/HomeWorks | Grafik Eye 3000 Family/HWI-WPM-6D-120 | 1 | 30 | 10% | 100% | <1s |
| Lutron | RadioRA 2 | RRD-6CL (R3) | 1 | 15 | 9% | 97% | <1s |
| Lutron | Maestro Wireless | MRF2-6CL (M6) | 1 | 15 | 9% | 97% | <1s |
| Lutron | HomeWorks QS | HQRD-6CL (H2) | 1 | 15 | 9% | 97% | <1s |
| Lutron | HomeWorks QS | HQRA-6CL (H2) | 1 | 15 | 9% | 97% | <1s |
| Lutron | RadioRA 2 | RRD-H6BRL (with neutral) | 1 | 10 | 9% | 97% | <1s |
| Lutron | HomeWorks QS | HQRD-H6BRL (with neutral) | 1 | 10 | 9% | 97% | <1s |
| Lutron | HomeWorks QS/myRoom | LQSE-4A1-D | 1 | 10 | 9% | 100% | <1s |
| Lutron | HomeWorks QS/myRoom | MQSE-4A1-D | 1 | 10 | 9% | 100% | <1s |
| Lutron | HomeWorks QS/myRoom | MQSE-3A1 | 1 | 10 | 9% | 100% | <1s |
| Lutron | HomeWorks QS/myRoom | MQSE-2A1-D | 1 | 10 | 9% | 100% | <1s |
| Lutron | Grafik T | GT-5NEM | 1 | 26 | 10% | 99% | <1s |
| Lutron | Grafik T | GTJ-5NEM | 1 | 26 | 10% | 99% | <1s |
| Lutron | Nova T | NTRP-250 | 1 | 26 | 8% | 99% | <1s |
| Lutron | Skylark Contour Slide to Off | CTCL-150 | 1 | 15 | 10% | 98% | <1s |
| Lutron | Caseta Wireless Phase Selectable | PD-5NE | 1 | 26 | 10% | 98% | <1s |
| Lutron | Vive | MRF2S-6ELV | 1 | 15 | 10% | 98% | <1s |
| Lutron | Vive | MRF2S-6CL | 1 | 15 | 9% | 97% | <1s |
| Lutron | HomeWorks QS | LQSE-4A-120-D | 1 | 19 | 10% | 99% | <1s |
| Lutron | Maestro | MACL-LFQ | 1 | 7 | 10% | 98% | <1s |
| Lutron | Lumea Slide-to-Off | LECL-150H | 1 | 15 | 10% | 98% | <1s |
| Lutron | Caseta Wireless | PD-6WCL (SD12) | 1 | 15 | 9% | 97% | <1s |

For Reference Only

| Dimmer Make | Dimmer Series | Dimmer Model # | Minimum Luminaires (per circuit) | Maximum Recommended Luminaires (per circuit) | Min Dimming percentage (%) | Max Dimming percentage (%) | Low End Start Time |
|-------------|---------------|----------------|----------------------------------|--|----------------------------|----------------------------|--------------------|
| Leviton | Decora | 6673 | 1 | 48 | 16% | 99% | <1s |
| Leviton | SureSlide | 6674 | 1 | 12 | 5% | 100% | <1s |
| Leviton | SureSlide | 6631-2 | 1 | 48 | 0% | 99% | N.A. ¹ |
| Leviton | Illumatech | IPL06 | 1 | 12 | 4% | 99% | <1s |
| Leviton | Vizia | VP106 | 1 | 48 | 2% | 99% | >1s |
| Leviton | Decora | 6161 | 1 | 40 | 6% | 99% | >1s |
| Leviton | SureSlide | 6633-P | 1 | 48 | 0% | 100% | N.A. ¹ |
| Lutron | Toggler | TG-600P | 1 | 48 | 0% | 98% | >1s ² |
| Lutron | Nova T | NTFTU-6A | 1 | 11 | 18% | 100% | <1s |
| Lutron | Maestro | MAW600 | 1 | 48 | 4% | 99% | <1s |
| Lutron | Toggler | TGCL-153P | 1 | 12 | 4% | 98% | <1s |
| Lutron | Lumea | LG600P | 1 | 48 | 0% | 99% | N.A. ¹ |
| Lutron | Skylark | SCL-153P-WH | 1 | 12 | 4% | 99% | <1s |
| Lutron | Diva | DV603P | 1 | 48 | 0% | 99% | N.A. ¹ |
| Lutron | Diva | DVCL-153P | 1 | 12 | 4% | 99% | <1s |
| Lutron | Maestro | MACL-153-M | 1 | 12 | 5% | 98% | <1s |
| Leviton | Vizia | VPE06 | 1 | 48 | 4% | 100% | <1s |
| Leviton | Illumatech | IPE04 | 1 | 24 | 3% | 100% | <1s |
| Leviton | Vizia | VZE04 | 1 | 32 | 6% | 100% | <1s |
| Leviton | Acenti | ATX10 | 1 | 81 | 3% | 100% | <1s |
| Lutron | Maestro | MAELV600 | 1 | 48 | 6% | 100% | <1s |
| Lutron | Faetra | FAELV500 | 1 | 40 | 6% | 100% | <1s |
| Lutron | Diva | DVELV303P | 1 | 24 | 3% | 100% | <1s |
| Lutron | Skylark | SELV300P | 1 | 24 | 3% | 100% | <1s |
| Lightolier | Sunrise | ZP260QEW | 1 | 21 | 5% | 100% | <1s |
| Eaton | Aspire | 9530AW | 1 | 48 | 0% | 100% | N.A. ¹ |
| Eaton | React | RI061 | 1 | 48 | 0% | 100% | N.A. ¹ |
| Eaton | Devine | TAL06P | 1 | 24 | 5% | 100% | <1s |
| Eaton | Toggle | DAL06P | 1 | 24 | 4% | 100% | <1s |
| Eaton | Skye | SAL06P | 1 | 24 | 5% | 100% | <1s |
| Eaton | Skye | SLC03P | 1 | 24 | 5% | 100% | <1s |
| Eaton | Devine | DLC03P | 1 | 24 | 5% | 100% | <1s |
| Eaton | Toggle | TI061 | 1 | 48 | 0% | 97% | N.A. ¹ |
| Lutron | LCP128 | LP-RPM-4U-120 | 1 | 35 | 0% | 100% | N.A. ¹ |
| Lutron | LCP128 | LP-RPM-4A-120 | 1 | 22 | 1% | 100% | <1s |
| Lutron | Ariadni | AY-600P | 1 | 48 | 1% | 100% | >1s |
| Lutron | Contour | CT-103P | 1 | 81 | 0% | 100% | N.A. ¹ |
| Lutron | Contour | CT-600P | 1 | 48 | 0% | 100% | N.A. ¹ |
| Lutron | Rotary | D-600P | 1 | 48 | 0% | 100% | N.A. ¹ |
| Lutron | Diva | DV-600P | 1 | 48 | 0% | 100% | N.A. ¹ |
| Lutron | Glyder | GL-600P | 1 | 48 | 0% | 100% | N.A. ¹ |
| Lutron | Lumia | LG-600PH | 1 | 48 | 0% | 100% | N.A. ¹ |
| Lutron | Maestro | MA-600 | | 48 | 5% | 100% | >1s |
| Lutron | Nova | N-600 | 1 | 48 | 0% | 100% | N.A. ¹ |
| Lutron | Skylark | S-600P | 1 | 48 | 0% | 99% | N.A. ¹ |
| Lutron | Centurion | C-600P | 1 | 48 | 0% | 100% | N.A. ¹ |
| Lutron | Ariadni | AYLV-600P | 1 | 36 | 0% | 100% | N.A. ² |
| Lutron | Glyder | GLV-600 | 1 | 36 | 0% | 100% | N.A. ¹ |
| Lutron | Diva | DVLV-600P | 1 | 36 | 0% | 99% | N.A. |
| Lutron | Lumina | LG-103P | 1 | 81 | 0% | 99% | N.A. |
| Lutron | Skylark | SLV-600P | 1 | 36 | 0% | 100% | N.A. ¹ |
| Lutron | Nova | NTLV-600 | 1 | 36 | 1% | 100% | <1s |
| Lutron | Nova | NT-600 | 1 | 48 | 0% | 100% | N.A. ¹ |
| Eaton | Smart | AAL06 | 1 | 24 | 4% | 100% | <1s |
| Eaton | Devine | TAL06P | 1 | 24 | 5% | 100% | <1s |
| Eaton | Toggle | DAL06P | 1 | 24 | 4% | 100% | <1s |
| Eaton | Skye | SAL06P | 1 | 24 | 5% | 100% | <1s |
| Eaton | Skye | SLC03P | 1 | 24 | 5% | 100% | <1s |
| Eaton | Devine | DLC03P | 1 | 24 | 5% | 100% | <1s |

1. Dim to off.

2. Shimmer at lower dim setting.

For Reference Only

| Dimmer Make | Dimmer Series | Dimmer Model # | Minimum Luminaires (per circuit) | Maximum Recommended Luminaires (per circuit) | Min Dimming percentage (%) | Max Dimming percentage (%) | Low End Start Time |
|-------------|---------------|----------------|----------------------------------|--|----------------------------|----------------------------|--------------------|
| Leviton | Decora | 6673 | 1 | 48 | 12% | 93% | <1s |
| Leviton | SureSlide | 6674 | 1 | 12 | 4% | 97% | <1s |
| Leviton | SureSlide | 6631-2 | 1 | 48 | 0% | 98% | N.A. ¹ |
| Leviton | Illumatech | IPL06 | 1 | 12 | 4% | 95% | <1s |
| Leviton | Vizia | VP106 | 1 | 48 | 0% | 96% | N.A. ¹ |
| Leviton | Decora | 6161 | 1 | 40 | 0% | 94% | >1s |
| Leviton | SureSlide | 6633-P | 1 | 48 | 0% | 96% | N.A. ¹ |
| Lutron | Toggler | TG-600P | 1 | 48 | 0% | 95% | N.A. ¹ |
| Lutron | Nova T | NTFTU-6A | 1 | 11 | 13% | 97% | <1s |
| Lutron | Maestro | MAW600 | 1 | 48 | 0% | 92% | N.A. ¹ |
| Lutron | Toggler | TGCL-153P | 1 | 12 | 4% | 90% | <1s |
| Lutron | Lumea | LG600P | 1 | 48 | 0% | 95% | N.A. ¹ |
| Lutron | Skylark | SCL-153P-WH | 1 | 12 | 3% | 90% | <1s |
| Lutron | Diva | DV603P | 1 | 48 | 0% | 94% | N.A. ¹ |
| Lutron | Diva | DVCL-153P | 1 | 12 | 4% | 90% | <1s |
| Lutron | Maestro | MACL-153-M | 1 | 12 | 4% | 82% | <1s |
| Leviton | Vizia | VPE06 | 1 | 48 | 0% | 98% | N.A. ¹ |
| Leviton | Illumatech | IPE04 | 1 | 24 | 4% | 100% | <1s |
| Leviton | Vizia | VZE04 | 1 | 32 | 1% | 97% | <1s |
| Lutron | Maestro | MAELV600 | 1 | 48 | 2% | 95% | <1s |
| Lutron | Faetra | FAELV500 | 1 | 40 | 1% | 96% | <1s |
| Lutron | Diva | DVELV303P | 1 | 24 | 0% | 93% | N.A. ¹ |
| Lutron | Skylark | SELV300P | 1 | 24 | 0% | 93% | N.A. ¹ |
| Lightolier | Sunrise | ZP260QEW | 1 | 20 | 4% | 97% | <1s |
| Eaton | Aspire | 9530AW | 1 | 48 | 0% | 100% | N.A. ¹ |
| Eaton | Skye | SF8AP | 1 | 76 | 16% | 97% | <1s |
| Eaton | Devine | DE06P | 1 | 48 | 0% | 83% | N.A. ¹ |
| Eaton | React | RI061 | 1 | 48 | 0% | 98% | N.A. ¹ |
| Eaton | Toggle | TI061 | 1 | 48 | 0% | 80% | N.A. ¹ |
| Lutron | LCP128 | LP-RPM-4U-120 | 1 | 35 | 0% | 97% | N.A. ¹ |
| Lutron | LCP128 | LP-RPM-4A-120 | 1 | 22 | 0% | 95% | N.A. ¹ |
| Lutron | Ariadni | AY-600P | 1 | 48 | 0% | 96% | N.A. ¹ |
| Lutron | Contour | CT-103P | 1 | 80 | 0% | 95% | N.A. ¹ |
| Lutron | Contour | CT-600P | 1 | 48 | 0% | 95% | N.A. ¹ |
| Lutron | Rotary | D-600P | 1 | 48 | 0% | 92% | N.A. ¹ |
| Lutron | Diva | DV-600P | 1 | 48 | 0% | 95% | N.A. ¹ |
| Lutron | Glyder | GL-600P | 1 | 48 | 0% | 95% | N.A. ¹ |
| Lutron | Lumia | LG-600PH | 1 | 48 | 0% | 95% | N.A. ¹ |
| Lutron | Maestro | MA-600 | 1 | 48 | 0% | 93% | N.A. ¹ |
| Lutron | Nova | N-600 | 1 | 48 | 0% | 97% | N.A. ¹ |
| Lutron | Skylark | S-600P | 1 | 48 | 0% | 95% | N.A. ¹ |
| Lutron | Centurion | C-600P | 1 | 48 | 0% | 97% | N.A. ¹ |
| Lutron | Ariadni | AYLV-600P | 1 | 36 | 0% | 96% | N.A. ¹ |
| Lutron | Glyder | GLV-600 | 1 | 36 | 0% | 97% | N.A. ¹ |
| Lutron | Diva | DVLV-600P | 1 | 36 | 0% | 95% | N.A. ¹ |
| Lutron | Lumina | LG-103P | 1 | 80 | 0% | 95% | N.A. ¹ |
| Lutron | Skylark | SLV-600P | 1 | 36 | 0% | 95% | N.A. ¹ |
| Lutron | Nova | NTLV-600 | 1 | 36 | 0% | 97% | N.A. ¹ |
| Lutron | Nova | NT-600 | 1 | 48 | 0% | 97% | N.A. ¹ |
| Eaton | Devine | TAL06P | 1 | 24 | 4% | 98% | <1s |
| Eaton | Toggle | DAL06P | 1 | 24 | 4% | 98% | <1s |
| Eaton | Skye | SAL06P | 1 | 24 | 4% | 97% | <1s |
| Eaton | Skye | SLC03P | 1 | 24 | 4% | 98% | <1s |
| Eaton | Devine | DLC03P | 1 | 24 | 4% | 97% | <1s |

1. Dim to off.

Dimmer Notes:

- 1) Start time is measured at the lowest dimmer setting.
- 2) Some LED dimmers have a "rapid start" design used to provide a momentary power boost to LED and CFL lamps during start-up. When a LED luminaire is on a dimmer with "rapid start" the boost may cause a momentary flash of the LED lighting. This "flash" is generated by the dimmer, and may be more noticeable when the dimmer is at a low setting. A solution is available with EATON dimmers which provide adjustment capability of the "rapid start": Devine (DAL06P), Accell (AAL06P), and Trace (TAL06P). Refer to product specifications online at www.eaton.com/lighting for more details.

Dimming Guide Disclaimer:

- 1) Leviton® is a registered trademark of Leviton Manufacturing Co. Inc.; Lutron® is a registered trademark of Lutron Electronics Co. Inc.; Lightolier® is a registered trademark of Philips Lighting; Hubbell® is a registered trademark of Hubbell Incorporated; Legrand® and Pass & Seymour® are registered trademarks of Legrand®. These companies and their tradenames, trademarks or brands, where noted, are associated with their respective company and are not associated with EATON.
- 2) Testing conducted by EATON is not a substitute for and does not imply certification by an independent laboratory or any other standards certification. Refer to the manufacturer specifications for more detailed information on product certifications and standards.
- 3) This is a representative list of typical dimmers as tested by EATON lighting solutions business for performance with the designated LED luminaires only. Test data contained in this literature is based upon dimmers obtained in the marketplace. Information about these other manufacturers products is obtained from packaging and published information made available by the manufacturer and is deemed to be reliable, but has not been verified. Dimmer performance and perceived limitations of the dimmers are based on factors outside of EATON's control. The specifications of these dimming controls and their conditions of use may change without notice to EATON lighting solutions or any other user. EATON lighting solutions makes no specific recommendation on product selection and there are no warranties of performance or compatibility implied. Installer must ensure proper local and national electrical codes are followed; and that the dimmer application and condition of use is per dimmer manufacturer instructions and guidelines.

Application Note - H277, H347 and H347200 step-down transformers are qualified to drive multiple Halo LED on a single circuit in Non-IC construction. Installation of these transformers with individual LED fixtures on circuits with multiple LED loads is not recommended. This is not recommended due to resulting multiple inductive currents pulled by each transformer; in this situation the majority of the power would then be reactive (VARs) and not real (WATTS). If H277, H347 or H347200 transformers should be used individually on each LED fixture in a single circuit, then that circuit should be sized for lowered power factor as well as increased apparent power on the circuit. H277, H347 and H347200 are UL/cUL listed for use with Halo recessed housings: H750T, H750TCP, H7T, H7TNB, H7RT.

Step Down Transformers

H277 = Steps 277 line voltage down to 120 volts. Attaches to knockout on first fixture's junction box in a circuit and is 300VA rated. H277 is a UL recognized Component listed under the luminaire UL/cUL listing for Halo Non-IC housings.

H347 and H347200 = Steps 347 line voltage down to 120 volts. Attaches to knockout on first fixture's junction box in a circuit. H347 is 75VA and H347200 is 200VA rated. H347 is a CSA/UL Listed Component for use under the luminaire UL/cUL listing with Halo Non-IC housings.

Transformer Load - H277 (300VA)

1. H277 Transformer at full loading consumes a maximum of 16W of power.
2. When a dimmer or switch is on the secondary (120V) side of the transformer, power is consumed by the transformer when the dimmer or switch is in "OFF" mode at 6.5W and in "ON" mode at 16W maximum under full loading.
3. When a dimmer or switch is on the primary (277V) side ahead of the transformer, power is consumed only in "ON" mode to a maximum of 16W under full loading.
(Use of a dimmer ahead of the transformer is not recommended)

Transformer Load - H347 (75VA)

1. H347 Transformer at full loading consumes a maximum of 15W of power.
2. When a dimmer or switch is on the secondary (120V) side of the transformer, power is consumed by the transformer when the dimmer or switch is in "OFF" mode at 2.5W and in "ON" mode at 15W maximum under full loading.
3. When a switch is on the primary (347V) side ahead of the transformer, power is consumed only in "ON" mode to a maximum of 15W under full loading.
(Use of a dimmer ahead of the transformer is not recommended)

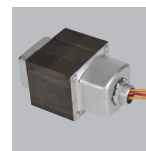
Transformer Load - H347200 (200VA)

1. H347200 Transformer at full loading on 120V side consumes a maximum of 28W of power.
2. When a dimmer or switch is on the secondary (120V) side of the transformer, power is consumed by the transformer when the dimmer or switch is in "OFF" mode at 9.2W and in "ON" mode at 28W maximum under full loading.
3. When a switch is on the primary (347V) side ahead of the transformer, power is consumed only in "ON" mode to a maximum of 28W under full loading.
When a switch is on the primary (277V) side ahead of the transformer, power is consumed only in "ON" mode to a maximum of 12W under full loading.
(Use of a dimmer ahead of the transformer is not recommended)

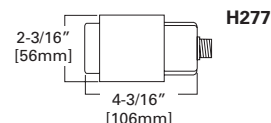
RSQ Retrofit LED Downlight Series

(RSQ Maximum Units on Step Down Transformer Powered Circuits)

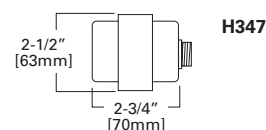
| Transformer | VA Rating | Max # of Fixtures | |
|-------------|-----------|-------------------|------------|
| | | 600 Series | 900 Series |
| H277 | 300 | 24 | 16 |
| H347 | 75 | 6 | 4 |
| H347200 | 200 | 16 | 10 |



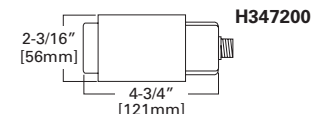
H277
277V Step Down Transformer,
300VA



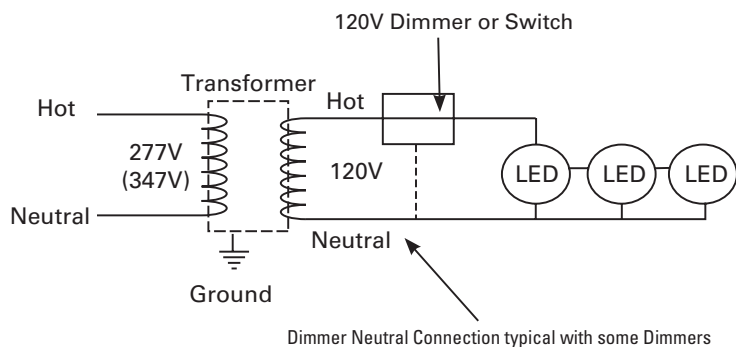
H347
347V Step Down Transformer,
75VA



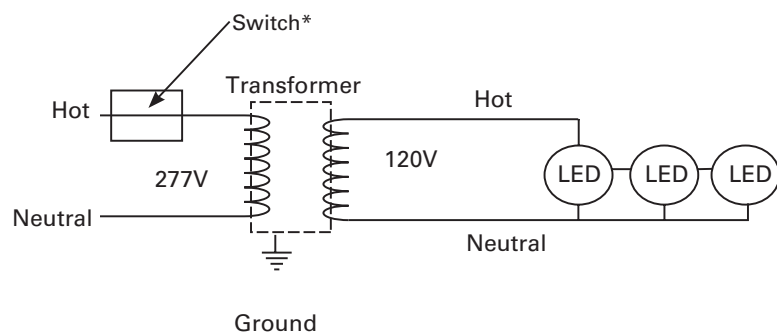
H347200
347V Step Down Transformer,
200VA



Transformer with Dimmer/Switch on 120V Secondary

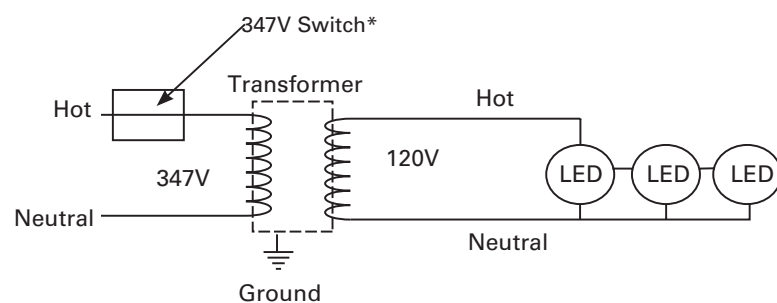


Transformer with Switch on 277V Primary



*Use of a dimmer ahead of the transformer is not recommended

Transformer with Switch on 347V Primary



*Use of a dimmer ahead of the transformer is not recommended