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Energi Savr Node with DALI® for Quantum and Athena

The Energi Savr Node family is a group of intelligent, modular products for the control of lighting loads. This document describes the Energi Savr Node with DALI®-compliant Digital Addressable loads. It provides DALI® loop power and control for two independent DALI® loops with up to 64 ballasts each. The Energi Savr Node unit with DALI® also provides direct connections and power for the following Lutron devices in a Quantum or Athena system:

- Occupancy sensors
- Daylight sensors
- IR receivers
- QS devices



Features

- Includes QS control link for seamless integration of lights in a Quantum or Athena system.
- Provides communication power for up to 2 loops of DALI_® compliant digitally addressable loads (up to 250 mA per loop).
- Each DALI_® loop can control a maximum of 16 zones.
- Provides power for two buses of DALI_®-compliant digital addressable loads. 128 mA guaranteed current, 250 mA maximum supply current per bus.
- Power failure memory retains control unit programming in the event of a power loss.
- Four occupancy sensor inputs for automated control of lights.
- Four daylight sensor inputs automatically adjust light levels based on the amount of natural light entering through the windows.
- Four IR receiver inputs for personal control.

Model Number

QSN-2DAL-S-CPN6916

DALICompatibility

The Lutron DALI® Energi Savr Node (ESN) is DALI-2® certified by the Digital Illumination Interface Alliance (DiiA)®. In order to ensure compatibility with Lutron DALI® controllers, the connected DALI® LED drivers and fluorescent ballasts must be DALI-2® certified and marked. In addition to compatibility, it is important to select high-quality and high-performance LED drivers and fluorescent ballasts. DALI-2® certified devices are readily available from many manufacturers and are tested for compatibility with the standard. For a complete list of available DALI-2® certified devices, see the DiiA® website at https://www.digitalilluminationinterface.org/products. DALI® devices that are not listed on the DiiA® website and are not marked DALI-2® cannot be considered DALI-2® certified.

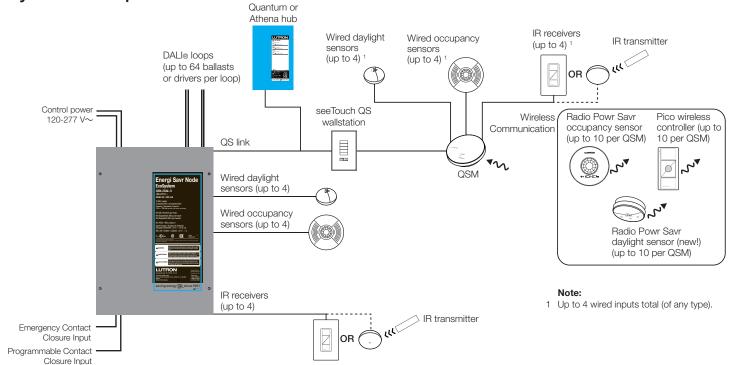
The DALl® version-1 standard does not ensure compatibility. To apply the original DALl® version-1 mark on LED drivers and fluorescent ballasts, no verification of the test results was required, and manufacturers could self-declare compliance and apply the DALl® mark. If you would like to use an LED driver or fluorescent ballast that is not DALl-2® certified but carries a DALl® version-1 logo, Lutron recommends that these devices be tested to ensure compatibility. Lutron is able to perform this testing on request. Samples of the drivers and light engines must be submitted to Lutron and the expected turnaround time is 6 to 8 weeks after the drivers are received. Fees for testing may apply. Lutron recommends that this testing be performed before the fixtures and lighting controls are purchased and installed. Contact your Lutron sales representative for more information.

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System Example



DALI®

Note: This device is not compatible with the Energi Savr Node *iPod* programming app. It is only for use in a Quantum or Athena system

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Specifications

Regulatory Approvals

- UL_® Listed
- CSA
- NOM Certified
- Lutron Quality Systems registered to ISO 9001.2015
- IEC 62386-101 Ed. 2
- Complies with requirements for use in other spaces used for environmental air (plenums) per NEC_® 2017 300.22(C)(3)
- Meets the Canadian National Building Code plenum requirements for a concealed space used as a plenum within a floor or roof assembly
- For commercial use, Class A only.

Power

- Control Power: 120-277 V ~ 50/60 Hz
- Maximum current draw: 0.5 A
- Lightning strike protection meets ANSI/IEEE standard 62.31-1980. Can withstand voltage surges of up to 6000 V
 — and current surges of up to 3000 A.
- DALI_® loop output: 18 V== 250 mA maximum per loop
- 10-year power failure memory: restores lighting to levels prior to power interruption.

Environment

- Ambient temperature operating range: 32 °F to 104 °F (0 °C to 40 °C).
- Relative humidity: less than 90% non-condensing.
- For indoor use only.

Terminals

- Control power wiring: 14 AWG to 12 AWG (2.5 mm² to 4.0 mm²)
- DALI_® digital loop wiring: 20 AWG to 16 AWG (0.5 mm² to 1.5 mm²)
- Input group wiring: 22 AWG to 12 AWG (0.5 mm² to 4.0 mm²)
- QS link wiring: 22 AWG to 12 AWG (0.5 mm² to 4.0 mm²)

Physical Design

• NEMA Type 1, IP-20 protection.

Mounting

• Surface-mount.

DALI_® Buses

- Up to 64 DALI_® compliant loads on each loop can be addressed and grouped into 16 zones.
- Supplies a maximum of 250mA to power each bus.
- Supplies a guaranteed current of 128 mA to power each bus.
- DALI_® loop wires are polarity insensitive and topology free.
- Automatic shutdown and restart after short-circuit.

QS Link Limits

- Each Energi Savr Node unit with DALI_® can provide up to 30 Power Draw Units for other QS devices. Refer to the QS link Power Draw Units specification submittal (Lutron P/N 369405) at www.lutron.com for more information concerning Power Draw Units.
- The QS Link can have up to 100 devices and 100 zones.
- Each Energi Savr Node unit with DALI_® counts as 1 device towards the 100 device limit.
- Each Energi Savr Node unit with DALI_® can count as 1 to 32 zones towards the 100 zone limit, depending on the number of zones created.
- A maximum of 8 DALI_® digital links may be connected to the QS link.
- A maximum of 512 DALI_® ballasts may be connected to the QS link.

QS Link Sensor Limits

- 100 wired and wireless occupancy sensors.
- 100 wired and wireless daylight sensors.
- 100 wired wallstations or Pico wireless controllers.

Sensors Connected to the Energi Savr Node unit with DALI®

- Four power supply outputs
- 20 V== 65 mA maximum

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Specifications (continued)

Occupancy Sensors

- Use Lutron LOS series of wired occupancy sensors in occupancy mode to control one or more areas.
- Use Lutron occupancy sensors in vacancy mode to automatically turn the lights off in an area after it becomes vacant.
- Use Lutron occupancy sensors to automatically turn the lights on in area when it becomes occupied and to automatically turn the lights off in an area after it becomes vacant.
- Each of the four occupancy inputs can power one Lutron occupancy sensor.
- Up to four additional Lutron wired occupancy sensors or ten additional Radio Powr Savr occupancy/vacancy sensors can be assigned per QS Sensor Module (QSM) on the QS link.

seeTouch QS Controls

- Refer to seeTouch QS spec submittal for further information.
- Configurable seeTouch QS wallstations, refer to the QS wallstation programming guide for configuration options

IR Controls

- Use Lutron IR receivers or wired Pico keypads for personal control of individual lighting zones.
- Four IR devices can connect directly to the Energi Savr Node unit with DALI_®.

Daylight Sensors

- Lutron daylight sensors allow daylight harvesting with programmable effect on light output.
- Four daylight sensors can be connected directly to the Energi Savr Node unit with DALI_®.
- Use Lutron EC-DIR-WH sensors to control one or more daylight rows.
- Alternatively, up to four additional Lutron wired daylight sensors or ten additional Radio Powr Savr daylight sensors can be assigned per QSM on the QS link.

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Contact Closure Input (CCI)

- Inputs must be dry contact closure, solid state, open collector, or active-low (NPN)/active high (PNP) output.
 - Open collector NPN or active-low on-state voltage must be less than 2 V and sink 3.0 mA.
 - Open collector PNP or active-high on-state voltage must be greater than 12 V and source 3.0 mA.
 - Open circuit voltage: 24 V maximum.
 - Off-state leakage current must be less than 100 μA.
 - Accepts maintained inputs and momentary inputs with 40 msec minimum pulse times
- Configurable for normally open (NO) or normally closed (NC) operation.
- Input is miswire-protected up to 36 V==-.
- Functionality defined by Quantum or Athena system programming.

Emergency Contact Closure Input

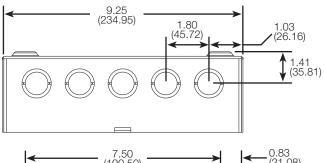
- By default, contact closure input from Lutron Emergency Lighting Interface (LUT-ELI-3PH), security, or fire alarm systems turns all zones on to full output when emergency state is detected.
- Emergency contact closure input is normally closed (NC). The Energi Savr Node unit with DALI_® is shipped with a jumper pre-installed.
- Response of each zone is configurable.
- Attached devices, by default, will go to maximum output and ignore control inputs.
- No operations will be allowed until emergency signal is cleared.
- Inputs must be dry contact closure, solid state, open collector, or active-low (NPN)/active high (PNP) output.
 - -Open collector NPN or active-low on-state voltage must be less than 2 V and sink 3.0 mA.
- Open collector PNP or active-high on-state voltage must be greater than 12 V and source 3.0 mA.
- Open circuit voltage: 24 V maximum.
- Off-state leakage current must be less than 100 μA.
- Accepts maintained inputs and momentary inputs with 40 msec minimum pulse times
- Input is miswire-protected up to 36 V==-.
- Emergency CCI cannot control other Energi Savr Node units.
- See Application Note #106, (P/N 048106) "Emergency Lighting" at www.lutron.com for more details.

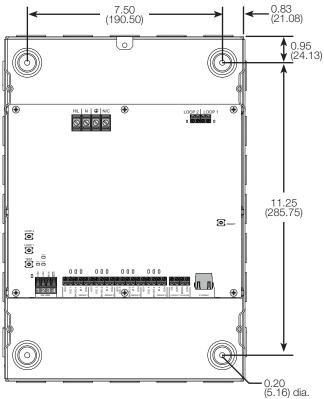
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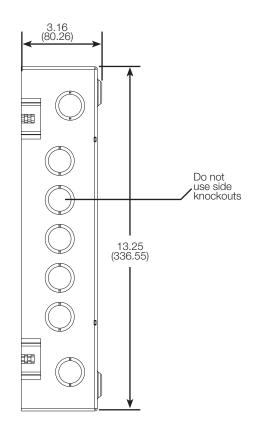
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Mechanical Dimensions

All dimensions shown as in (mm)







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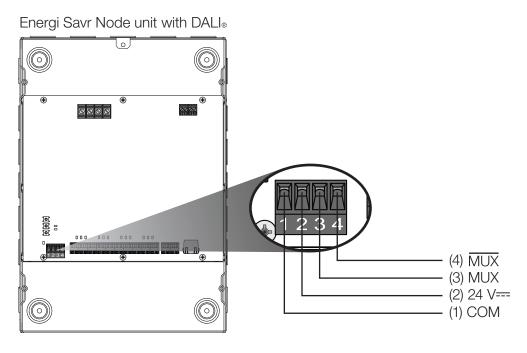
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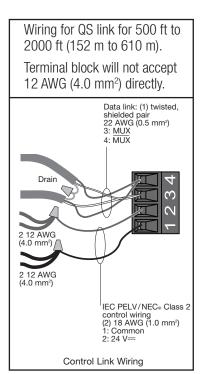
Wiring: QS Link

- QS link communication uses IEC PELV/NEC_® Class 2 wiring. Follow all local and national electrical codes when installing IEC PELV/NEC_® Class 2 wiring with line voltage wiring.
- The total distance of the QS link wiring must not exceed 2000 ft (610 m).

QS Link Wiring Distance	Wire Gauge	Available from Lutron in one cable:
Less than 500 ft	Power (terminals 1 and 2): 1 pair 18 AWG (1.0 mm²)	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
(152 m)	Data (terminals 3 and 4): 1 pair 22 AWG (0.5 mm²), twisted and shielded*	
500 (I L 0000 (I	Power (terminals 1 and 2): 1 pair 12 AWG (4.0 mm²)	CDV CDI 46L (non planum)
500 ft to 2000 ft (152 m to 610 m)	Data (terminals 3 and 4): 1 pair 22 AWG (0.5 mm²), twisted and shielded*	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)

* Alternate Data-only cable: Use approved data link cable 22 AWG (0.5 mm²) twisted/shielded from Belden, model #9461.





QS Link Wiring:

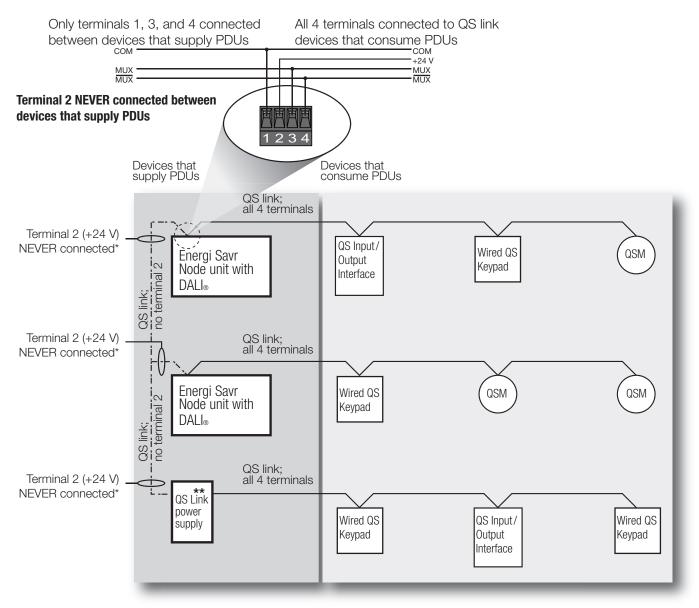
• 22 AWG to 12 AWG (0.5 mm² to 4.0 mm²)

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Wiring: QS Link (continued)



QS Link Wiring Rules

- * Terminal 2 (+24 V) should NEVER be connected between devices that supply PDUs.
- ** For QS Link power supply wiring connection details, refer to the installation instructions for the specific power supply model being used.

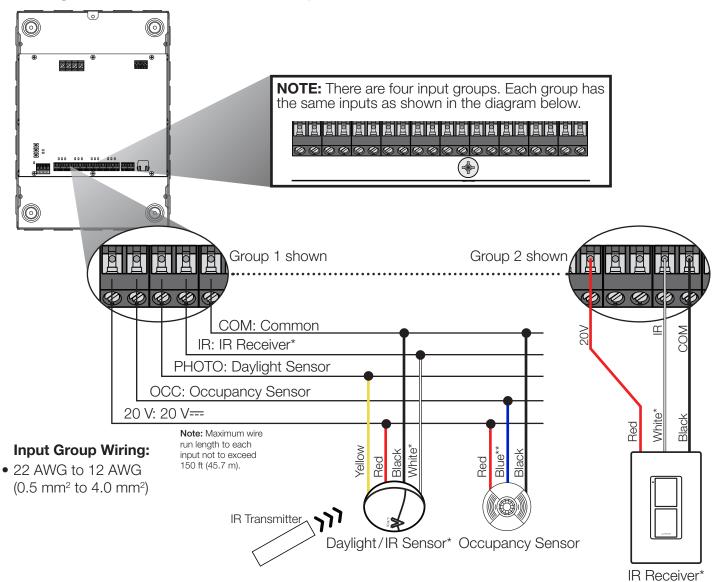
NOTE: Refer to the QS Link Power Draw Units specification submittal (Lutron P/N 369405) at www.lutron.com for information concerning Power Draw Units (PDUs).

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Wiring: IEC PELV/NEC® Class 2 Inputs



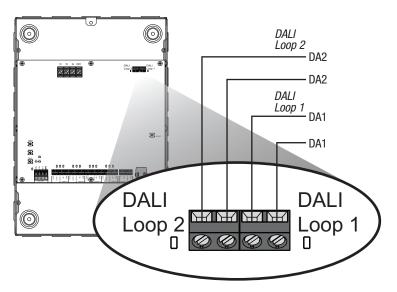
- * Note: Only one IR device may be connected per IR input. If the IR signal from a daylight sensor is connected, a wall control may not be connected to the same input, and vice-versa.
- **Connect the gray wire on -R model occupancy sensors.

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Wiring Diagram: DALI_® Loop



The Energi Savr Node unit with DALI_® will supply power to an independent DALI_® loop, which supports a maximum of 64 ballasts per loop.

DALI® Wiring

- DALI® wiring is not SELV.
- DALI_® wiring is treated as line voltage, and thus may be run within the same sheathing.
- Ensure that there is not greater than a 2 V=== drop between the Energi Savr Node unit with DALI_® and the end of the DALI_® loop.
- Consult all national and local electrical codes for separation requirements.

	Maximum DALI _® Compliant Bus Wire Length
16 AWG (1.5 mm ²)	980 ft (300 m)
18 AWG (1.0 mm ²)	490 ft (150 m)
20 AWG (0.5 mm ²)	325 ft (100 m)

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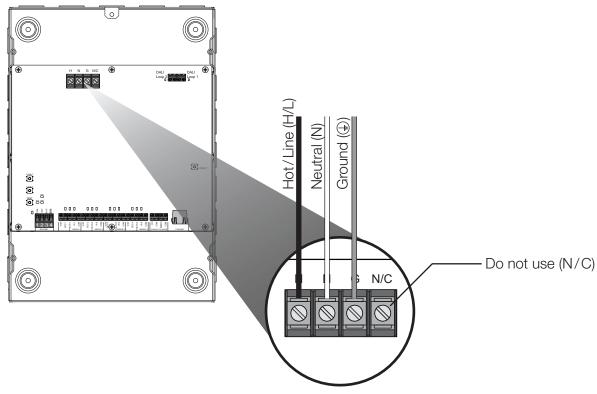
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Wiring: Control Power

Wiring Notes

- Control Power wiring should be from a normal, non-emergency feed for proper operation of the Energi Savr Node unit with DALl_®.
- Power terminals accept (1) or (2) 14 AWG to 12 AWG (2.5 mm² to 4.0 mm²) solid or stranded wire.

Energi Savr Node unit with DALI

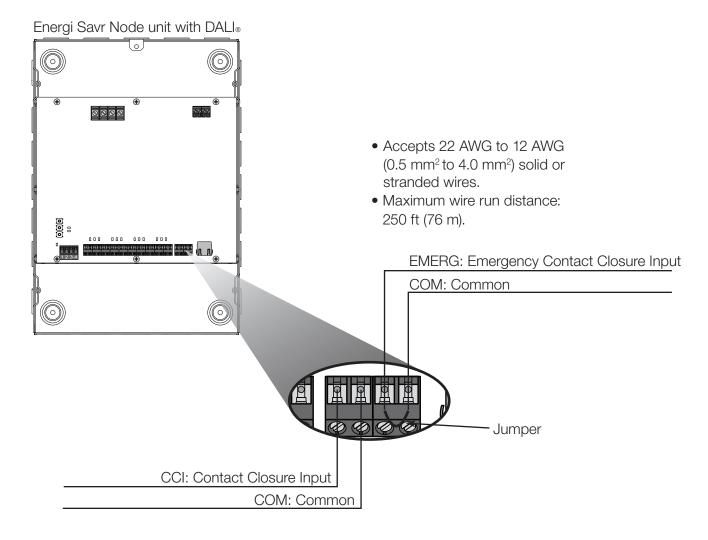


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Wiring: Contact Closure Inputs



Emergency CCI

- The attached device must provide a closed dry contact closure or solid-state output.
- Input is miswire-protected up to 36 V===.
- The Energi Savr Node unit with DALI_® is shipped with a jumper pre-installed in the Emergency Contact Closure Input.
- Emergency mode is activated by opening the Emergency Contact Closure. Pre-installed jumper must be removed to utilize this function.
- See Application Note #106, (P/N 048106)
 "Emergency Lighting" at www.lutron.com for more details.

Programmable CCI

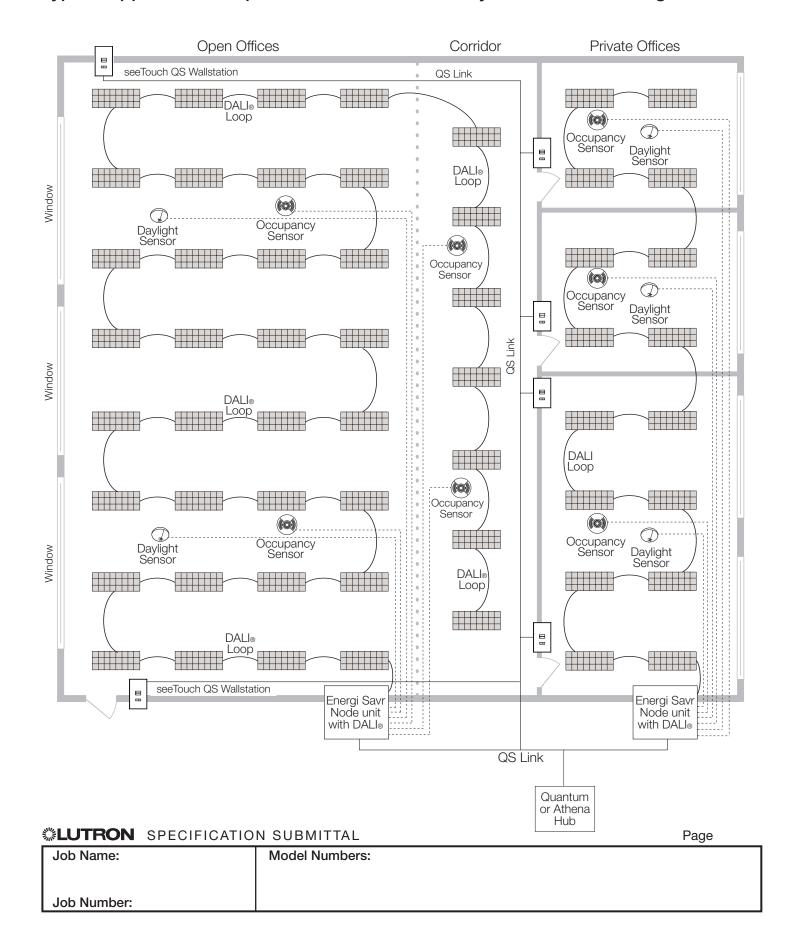
- The attached device must provide a dry contact closure or solid-state output.
- Input is miswire-protected up to 36 V===.

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Typical Application: Requires Quantum or Athena system commissioning



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Troubleshooting and Maintenance Features

- Maintains redundant memory of ballast programming for ease of single or multiple ballast replacement.
- After installation, "TEST" button verifies DALI® wiring on all fixtures.
- Status LEDs verify connections to control stations and sensors.
- After installation, Energi Savr Node unit with DALI® identifies ballast communication failures.

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