



Radium
Die Lichtmarke

Radium

Correct Conversion.

What to consider when switching to modern LED tubes.

Guide for efficient installation.

www.radium.de

Conversion to LED Tubes. Important Basics.



Radium LED lamps are designed to replace traditional light sources.

Before you decide to convert, please, check the existing fixtures for compatibility. Both testing and the conversion must be performed by a qualified electrician. The operator has to ensure that the photometric and safety-relevant properties still comply with the applicable standards after retrofitting. The photometric properties do not just depend on the light source, but on the entire system consisting of luminaire and lamp.

As a matter of principle, we recommend regular visual inspections of the luminaires to identify safety gaps due to defective components (lamp holders, cables, housing parts, etc.) at an early stage and to be able to repair them then. The operator of a lighting system is responsible for the safe operation of the lighting system, irrespective of the products in use.

Choosing the Right LED Tubes. The Decisive Factor is the Operating Mode.



Ballasts are required for the operation of traditional discharge lamps. For fluorescent lamps and compact fluorescent lamps, the following conventional ballasts and starters (CCG, CCG mode) and electronic ballasts (ECG or Dim-EC) are customary.

In order to select the correct LED retrofit lamp, the operating mode of each lamp must be identified correctly.

Tubular lamps are used everywhere. They are a perfect fit for industrial halls and parking garages, but they are also suitable for indirect lighting, just to quote a few examples. Whereas in the past it was always fluorescent tubes the trend is now moving more and more towards LED tubes. And for good reason. Radium LED tubes, for example, save up to 60 % energy, have a much longer life, and offer good lighting properties such as a fast, flicker-free start-up and highly efficient operation - especially at low ambient temperatures.

The most important matter to consider when converting fluorescent tubes to LED technology is the type of luminaire. Because different luminaires also come with different types of connection.



„Glass vs. Plastic“
LED tubes by comparison
Learn more from [our video](#).

What are the connection possibilities for LED tubes?
The four circuit options at a glance..



ECG Operation

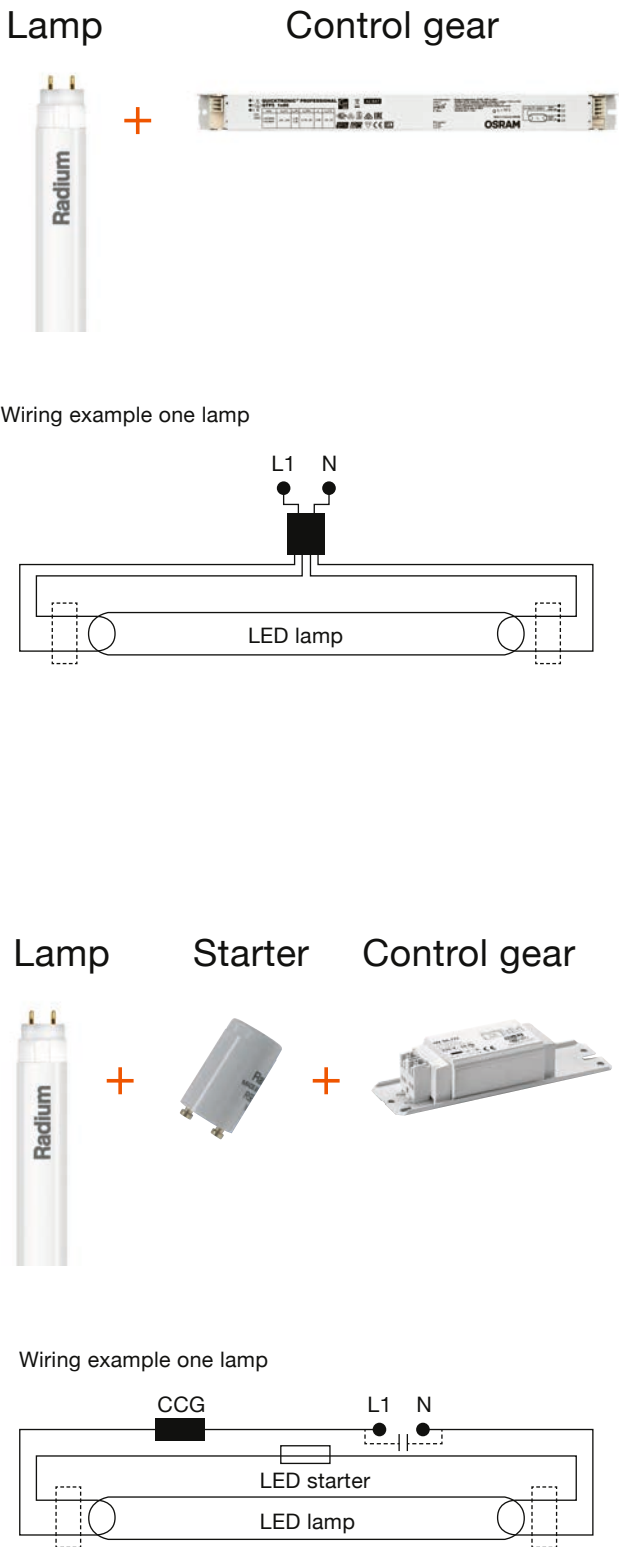
For the conversion of luminaires operated by electronic ballast the tubes can be exchanged 1:1, if the compatibility of the LED tube with the electronic ballast can be proven. For this purpose, Radium publishes relevant compatibility lists on www.radium.de/compatibility. Only lamps may be operated on successfully tested ECGs. The compatibility list is based on tests carried out by Radium in a standardized environment. Results may vary in real applications due to various factors. Radium LED tubes with an HF or UN marking and the ECG pictogram are suitable for replacement.

If the electronic ballast of your luminaire is not mentioned in the compatibility list or it even proves to be incompatible, the lamp must not be operated with this ECG. If an LED lamp should still be used in this fitting, luminaire can be converted to AC or DC operation. Further information about the use of LED tubes in luminaires with ECG and further wiring diagrams can be found in our installation guide: www.radium.de/download/installation-instruction-led-tubes



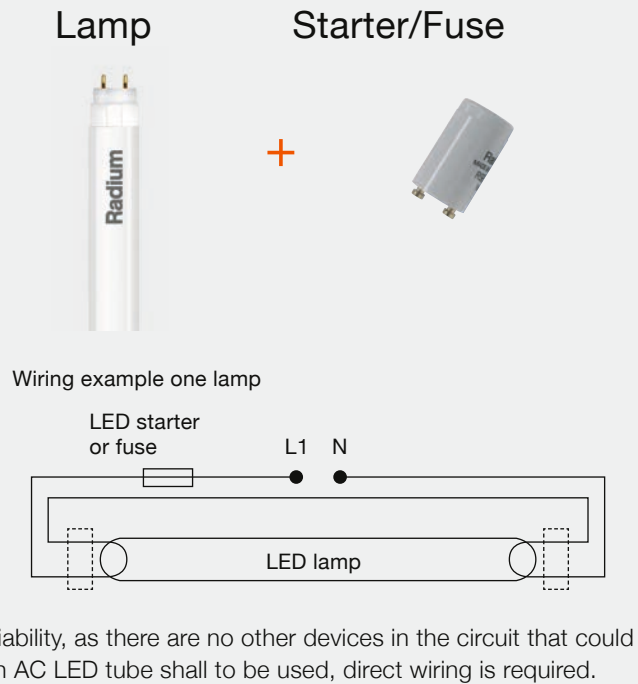
CCG/LLG Operation

For luminaires with conventional ballast (CCG/LLG), the fluorescent tube is replaced with an LED tube 1:1 without having to make any changes to the wiring. The CCG/LLG can remain in the luminaire. The starter must be replaced with LED starter supplied with the luminaire. We recommend removing the compensation capacitor. In addition, the luminaire must be clearly marked, so that afterwards only lamps shall be used that are suitable for this operation - for example: „For LED tubes only“. Radium LED tubes with the marking UN or EM and the CCG pictogram are suitable for direct replacement. Further instructions for retrofitting and further circuit diagrams can be found in our installation guide: www.radium.de/download/installation-instruction-led-tubes



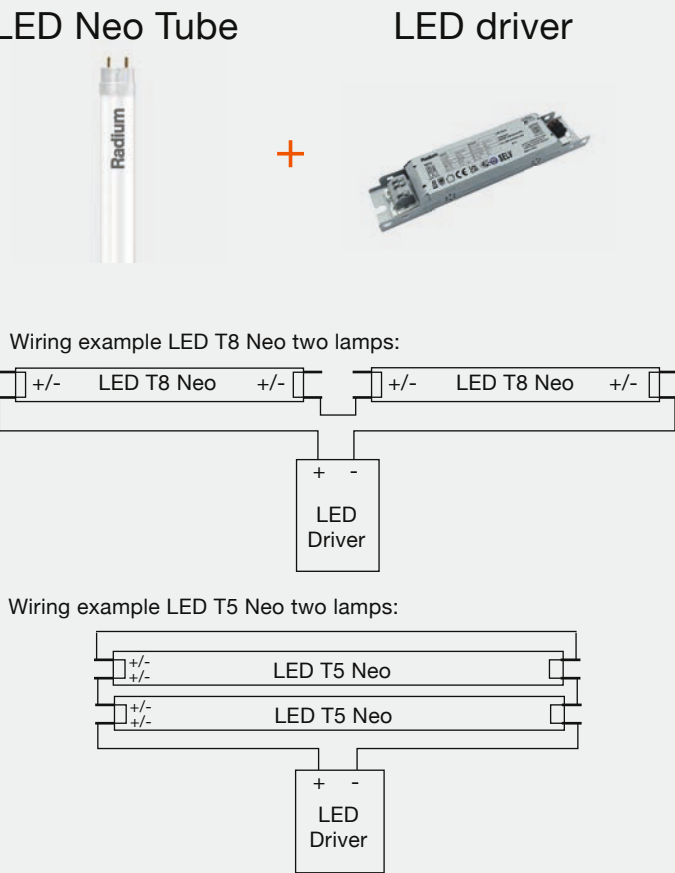
Direct Wiring (230 V)

With direct wiring, the LED tube is operated without a ballast directly on the mains voltage. If the existing luminaire is not designed for this type of operation, the luminaire must be converted. This conversion must be carried out by a electrician according to the applicable safety standards. We also recommend integrating a fine-wire fuse into the circuit (which can either be the LED starter supplied or a terminal with an integrated fine-wire fuse) and also to mark the luminaire clearly after the conversion. Further instructions for retrofitting and further circuit diagrams can be found in our installation guide: www.radium.de/download/installation-instruction-led-tubes Radium LED tubes with the marking AC, EM or UN are suitable for operation without ballast, directly on 230 V. Direct wiring can further reduce energy consumption and increase reliability, as there are no other devices in the circuit that could fail or affect the LED tube. If the existing ECG is not supported or if an AC LED tube shall to be used, direct wiring is required.



DC Operation

Both luminaires with conventional ballasts (CCG) and with electronic ballasts (ECG) can be converted to DC operation. DC LED tubes are designed for operation with an external constant current LED driver. For operation in existing luminaires, the installed CCG or ECG must be replaced with a fitting LED driver. Due to the precisely coordinated electronics, maximum reliability, safety, performance and some additional functions such as dimmability can be realized. The conversion must be carried out by a qualified electrician in compliance with the applicable safety standards. After the conversion, the luminaire must be marked so that only lamps suitable for this operation are used. From Radium, LED tubes with the NEO marking and the DC pictogram may be used for this mode of operation. Further technical information and circuit diagrams can be found in our conversion instructions www.radium.de/download/conversion-guide



Sought and Found.

Decision-Making Aids on your path to the right lamp.

When choosing the right Radium LED tube as a replacement for conventional fluorescent tubes, several factors play a role. First and foremost are the **technical requirements**, which are given by the installation situation on site. For example, one decisive factor is whether the luminaires are fitted with the classic T8 tubes with a diameter of 26 mm or T5 tubes with a slimmer diameter of 16 mm. For both variants there are corresponding LED replacements. In addition, the mode of operation also plays a role. As shown on the previous pages: **Direct wiring, CCG operation** or **ECG operation**. Conversion to LED Neo tubes is always a real option, because they have got very good technical properties, such as high efficiency and long life, and what's more: they offer the additional advantage of possible dimmability. In the case of a luminaire with CCG, you can also use EM or UN lamps. With ECG operation, after successful compatibility test (see page 05), HF or UN lamps can be used. Even if you have decided on an operating mode, there are usually different tubes to choose from, which **differ in their performance**.

This be detected from efficiency, brightness or service life of the lamps.

In addition, other questions have to be clarified such as: What are the environmental conditions on site? What should or must the new LED tube be able to do? For example, should it be dimmable? How important are factors such as shatter protection or being storage friendly? Should the tubes have a motion sensor to save electricity costs or do you want to integrate your system into an IoT network?

The table below should help you more easily find the right Radium LED tubes for your specific applications and requirements.

Glass All Radium LED tubes are made of glass. This gives them a true to original appearance and has the advantage that the tubes do not bend when heated. A large part of the tubes also does have shatter protection.

Comparison of Radium LED Tubes

Family	1:1-Exchange	Mode of operation				Shatter protection	Output	Efficiency	Service Life L70B50	Storage friendly	Dimmable	Suitable for emergency power	Extra feature
		HF	EM	AC	DC								
T8 Tubes, 26mm Diameter													
LED Star Tube T8 H0 HF	✔	✔ *	–	–	–	✔	● ●	D	● ●	–	–	–	–
LED Star Tube T8 HF	✔	✔ *	–	–	–	✔	● ●	D	● ●	–	–	–	–
LED Essence Tube T8 HF	✔	✔ *	–	–	–	–	●	E	●	–	–	–	–
LED Star Tube T8 H0 UN	✔	✔ *	✔	✔	–	✔	● ●	C	● ●	✔	–	–	–
LED Essence Tube T8 UN	✔	✔ *	✔	✔	–	–	●	E	●	✔	–	–	–
LED Star Tube T8 Plus U0 EM	✔	–	✔	✔	–	✔	● ● ●	C	● ● ●	–	–	–	–
LED Star Tube T8 Plus EM	✔	–	✔	✔	–	✔	● ●	C	● ● ●	–	–	–	–
LED Star Tube T8 H0 EM	✔	–	✔	✔	–	–	● ●	C	● ●	–	–	–	–
LED Star Tube T8 EM	✔	–	✔	✔	–	–	● ●	D	● ●	–	–	–	–
LED Star Tube T8 Motion Sensor	✔	–	✔	✔	–	✔	● ●	C	● ●	–	–	–	Motion sensor
LED Star Tube T8 Food	✔	–	✔	✔	–	✔	●	–	● ●	–	–	–	For food lighting
LED Essence Tube T8 EM	✔	–	✔	✔	–	–	●	E	●	–	–	–	–
LED T8 Neo	Re-Wiring	–	–	–	✔	✔	● - ● ● ● **	C	● ● ●	✔	✔	✔	Suitable for DALI
T5 Tubes, 16mm Diameter													
LED Star Tube T5 H0 HF	✔	✔ *	–	–	–	✔	● ● ●	D	● ●	–	–	–	–
LED Star Tube T5 HE HF	✔	✔ *	–	–	–	✔	●	D/E	● ●	–	–	–	–
LED Star Tube T5 H0 AC	Re-Wiring	–	–	✔	–	✔	● ● ●	D	● ●	–	–	–	–
LED Star Tube T5 HE AC	Re-Wiring	–	–	✔	–	✔	●	D	● ●	–	–	–	–
LED T5 Neo	Re-Wiring	–	–	–	✔	–	● - ● ● ● **	C	● ● ●	✔	✔	✔	Suitable for DALI

The comparison data in the table are based on those of the 1500mm tubes (4000K).
* check compatibility
** luminous flux adjustable
Performance steps for output and service life:
● good value ● ● high value ● ● ● very high value

Motion sensor tubes are suitable for applications where permanent light is not needed.
Food tubes are very good in the food industry due to their light color of 3300K and their shatter protection.
Note regarding ECG operation: Please, check compatibility before conversion in any case.
For **large projects**, we advise against retrofitting ECG luminaires with HF or UN tubes due to unpredictable infrastructure.
We recommend upgrading to LED T8/T5 Neo.

Labeling of Radium LED tubes.

Our Portfolio at a Glance.

S

Star – Perfect allrounder for professional use.

SP

Star Plus – Highest demands on function and quality for professional use.

HE

High Efficiency – Replacement of T5 HE fluorescent lamps, for particularly efficient lighting.

HO

High Output – For applications requiring high luminous flux and for replacement of T5 HO fluorescent lamps.

UO

Ultra Output – For applications, where a particularly high luminous flux is required.

MS

Motion Sensor – LED tubes with integrated motion sensor.



In our online catalog you will find all Radium LED tubes at a glance
www.radium.de/en/product-catalogue/led-lamps/led-tube

UN

Universal – For operation with conventional ballasts (CCG) and selected electronic ballasts (ECG). Check ballast compatibility in any case at www.radium.de/compatibility before retrofitting, since UN tubes may only be operated with tested ECGs. Also suitable for direct connection to mains voltage (230 V).

HF

High Frequency – Suitable for operation with selected electronic ballasts (ECG). Check ballast compatibility in any case at www.radium.de/compatibility before retrofitting.

EM

Electromagnetic – Suitable for operation with CCG. Simply replace the existing starter with the supplied LED starter. Also suitable for direct connection to mains voltage (230 V).

AC

Alternating Current – For direct operation on mains voltage without additional operating devices (230V).

NEO(DC)

Neo (Direct Current) – For operation on Radium LED drivers (DC) for optimum performance, reliability and functionality.



Nomenclature (examples)

RL – T8 36 SP UO 840 / G13 EM

RL	–	T8	36	SP	UO	840	/	G13	EM
Radium LED		Design – T8 – T5		Star Plus		Light color – 830 – 840 – 865		Base	
				Replacement for Watt (NL) fluorescent lamp		Ultra Output			Electromagnetic

RL – T8 36 S 830 / G13 HF

RL	–	T8	36	S	830	/	G13	HF
Radium LED		Design – T8 – T5		Star		Light color – 830 – 840 – 865		Base
				Replacement for Watt (NL) fluorescent lamp				High Frequency

Before choosing a suitable LED tube.

Analyze your luminaire.

Three simple tricks to determine the mode of operation.

You want to replace your old fluorescent tubes with modern LED lamps, but you are unsure which LED tube you can operate in your luminaire? To do this, you should first find out which ballast is installed in your luminaire. Three simple tricks will help you:

1. Starter check: does the luminaire have a starter?

Check to see if there is a starter in your luminaire. If so, a conventional ballast (CCG) is installed. If not, in all probability an electronic ballast (ECG) will be installed.

2. Dimmability check: is the luminaire dimmable?

Check to see if your luminaire is dimmable. If the light can be dimmed, an ECG is installed. If not, either a simple, non-dimmable ECG or a CCG will be installed (please do the starter check again, see point 1).

3. Smartphone camera check: Does the light of the fluorescent tube flicker?

Switch on the luminaire with your old fluorescent tube. Look at the lamp through your smartphone camera. If it flickers, a CCG is installed. If not, in all probability an ECG is installed.



For more details, please, take a look at [our video](#).

Technical terms.

Important notes and explanations.

T_c

All radium lamps have a limited thermal operating range. This can be found in the data sheets. To enable users and/or retrofitters to determine the safe operating range, our lamps have a marked T_c point. The maximum T_c temperatures published in the data sheet must be observed under all circumstances. We can only guarantee safe operation of the lamp within this permissible temperature range. We therefore recommend carrying out a test installation with temperature measurement.

T_a

The T_a value indicates the maximum ambient temperature at which the LED lamp may be operated.

T_c -point



Output

Selecting the right luminous flux for the required application is not always easy. In good many times, LED replacement types are offered in various different luminous fluxes, for example to replace a 58W fluorescent lamp.

An LED tube provides proportionately much more light for the area to be illuminated than a fluorescent tube. With fluorescent tubes, more light is emitted to the rear, which means that 20-40% of the luminous flux may be lost. LED tubes, on the other hand, thus have a higher illuminance on the surface to be illuminated with the same luminous flux and are therefore brighter.

When using Radium LED Neo tubes, you have the option to individually adjust the luminous flux via DipSwitch on the LED driver and – even more – to dim the tube.

Shatter protection

The majority of our LED tubes are made of a long-proven material: glass. While other LED tubes sag quickly or bend when exposed to heat, a glass bulb remains rigid, ensuring a clear appearance. For high protection during transport and operation, shatter protection secures the glass tubes. Even if the bulb is broken, this ensures that no splinters escape which could cause injuries or contaminate production.

This means that the lamps are even suitable for use in the food industry (IFS).



Smart, efficient and environmentally friendly.

Radium LED Neo Tubes.

Conversion and Liability

The Radium LED drivers replace 1:1 existing electronic ballasts or CCG. Ideal for quickly making your own lighting system fit for the future. Depending on the LED driver, up to four Radium LED T8 Neo® or LED T5 Neo can be connected (connection diagram on p. 05).

Whether fire protection or building insurance - there are many players who look critically at innovations. We have thoroughly tested the combination of LED driver and LED-tubes, and the responsible master electrician certifies the safe and standard-compliant operation of the converted luminaire with Radium LED Neo tubes by specialist contractor declaration. For larger projects, a factory test can also be carried out by Radium. Please, do not hesitate to contact us.

Advantages of Radium LED Neo Tubes

- Increase in efficiency: up to 190 lm/W
- Super bright: up to 6,100 lm per lamp
- Extremely long life: up to 70,000 h L80B10
- Future-proof thanks to DALI control
- TÜV certified
- Flicker-free
- Dimmable
- Suitable for emergency power
- Inexpensive
- 5 years guaranty



Upgrade for the future

The LED T8 Neo® and LED T5 Neo transform your existing luminaires into modern lighting systems that shall be super bright, flicker-free, dimmable, suitable for emergency power supply and DALI-capable as well. A coherent product concept that is second to none.

Its highlight: the external LED driver equips every Radium LED Neo tube with efficient functions for modern lighting management.

Our Radium LED T8 Neo® and LED T5 Neo tubes fit into all standard G13 or G5 holders and tune in with the dimensions of a classic fluorescent tube. To convert to Radium LED Neo tubes, just replace the lamp and replace the ECG or CCG 1:1 with the LED driver. The LED tube and the LED driver are optimally matched to each other, so no compatibility tests are necessary after the conversion.

In short, converting to Radium LED Neo tubes works as easily as replacing defective ballasts in classic luminaires. Just install the new driver, screw in the Radium LED Neo tube, label the luminaire - and you're done!

Converting your lighting system to Radium LED T8 Neo® or LED T5 Neo is the optimal upgrade for the future. Because in addition to low purchase and operating costs, you also benefit from high efficiency and future-proof lighting management.

Radium LED Neo tubes - the game changer when to switching to modern LED tubes is regarded!

More information at www.radium.de/led-t8-neo.

Arrange a consultation appointment now!



Scan QR code and make a **consultation appointment**.

Conversion made easy. With our checklist for LED T8 Neo®.



Use the **conversion checklist** for the changeover to Radium LED T8 Neo®. So, you will think of everything – guaranteed.
















Find the fitting LED T8 Neo®.



In our **product overview** you can learn more about suitable LED drivers, operating currents and circuit examples.

Pictograms on our packaging.

Relevant Information at a Glance.

	CCG operation		Not dimmable
	ECG operation		Not water protected
	Direct wiring		Only suitable for indoor use
	Suitable for DC operation		For operation in open luminaires
	No CCG operation		Not suitable for emergency power
	No ECG operation		Mercury content
	No operation under direct wiring		Frequencies 50-60 Hz
	Operating temperature		Installation by qualified electrician
	Dimensions		



Radium Lampenwerk GmbH

Dr.-Eugen-Kersting-Str. 6
51688 Wipperfürth
Germany

Telephone +49 (0) 2267 811
Telefax +49 (0) 2267 81353

radium@radium.de
www.radium.de