

Start here

**CONTACT AN APPLICATION SPECIALIST**

A Traco Power Railway & Ruggedized product may not be required. Our Application Specialists help you find the right solutions, including

- Market specific standard component
- Application specific solution

NO

Application on rolling stock or demanding application?

YES

**GOOD TO KNOW**

The railway industry has some of the most stringent quality, longevity and performance requirements for electrical power converters. The respective certifications and design criteria present a de-facto standard for use in demanding applications in other industries:

- Wide and ultra wide continuous and transient operating voltage ranges
- Increased operating temperature range from -40°C to 85°C
- Best-in-class EMI performance
- High resistance to mechanical shocks & vibration (EN 61373)
- Certified materials for fire safety (EN 45545-2)
- EN 50155 and additional EN/IEC/UL 62368-1 certifications

**CONTACT AN APPLICATION SPECIALIST**

Requirements of AC/DC power conversion products on rolling stock are generally application specific. Our Application Specialists help you find the right solutions, including:

- Selected Industrial Automation component
- Modified/repurposed component
- Application specific solution

NO

DC/DC?

YES

**GOOD TO KNOW**

Lower power DC/DC converters present a reliable, safe, efficient, compact and cost-effective way of providing power. Applications include battery-powered devices or components connected to other power converters upstream. AC/DC converters are commonly referred to as power supplies and are directly connected to an alternating current grid. The vast majority of low power converters on (rail) vehicles is DC/DC.

**CONTACT AN APPLICATION SPECIALIST**

Non-isolated "point-of-load" (POL) DC/DC converters are used in Railway & Ruggedized applications across-the-board. Our Application Specialists help you find the right solutions. Options may include:

- Selected Industrial Automation component
- Modified/repurposed component
- Application specific solution

NO

Isolated?

YES

**GOOD TO KNOW**

Galvanic isolation presents both a functional requirement as well as a safety measure for power converters. Galvanic isolation requires magnetic transformers which add to the complexity of the design, manufacturing and quality control of the power converter. Railway & Ruggedized DC/DC converters from Traco Power increase the safety and reliability of your design and significantly reduce time-to-market. The total cost of ownership (TCO) of power modules compares favorably to those of discrete solutions, which have to be developed, tested, maintained and supported in house.

**CONTACT AN APPLICATION SPECIALIST**

Railway & Ruggedized products are primarily designed for applications on a railcar or comparable. An application specialist can help you find the suitable product for other user areas of use. Options may include:

- Selected Railway & Ruggedized or Industrial Automation component
- Modified/repurposed component
- Application specific solution

NO

EN 61373 Location Category 1 or comparable?

YES

**GOOD TO KNOW**

The EN 61373 defines three location categories for applications on rail vehicles:

- Category 1 class A: on or under the car body
- Category 1 class B: in underframe or large internal cubicle fixed to car body or in subassembly fixed to the cubicles described before.
- Category 2: mounted to the bogie
- Category 3: mounted on the axle assembly

Traco Power Railway & Ruggedized components are designed to withstand the mechanical stresses from shock & vibration according to EN 61373 Category 1.

**CONTACT AN APPLICATION SPECIALIST**

For applications in close proximity to heat sources such as motors, our Application Specialists help you select the best solution. Options may include:

- Selected Railway & Ruggedized component
- Modified/repurposed component
- Application specific solution

UN-SURE

Operating temperature criteria OT1 – OT6?

YES

**GOOD TO KNOW**

Railway & Ruggedized components can operate safely and reliably within a wide range of ambient temperatures like they occur in parked vehicles in winter or inside a control panels exposed to direct sunlight in summer. Equipment temperature operating ranges are defined by the EN 50155:

	AMBIENT TEMPERATURE	
	MINIMUM	MAXIMUM
OT1	25°C	55°C
OT2	40°C	55°C
OT3	25°C	70°C
OT4	40°C	70°C
OT5	25°C	85°C
OT6	40°C	85°C

Extended operating temperature class ST1 and ST2 denote a transient temperature increase of +15°C, ST0 denotes no transient temperature increase.

**CONTACT AN APPLICATION SPECIALIST**

When mounted on the outside of a vehicle, electrical components such as DC/DC converters are commonly placed inside sealed, weatherproof containers. Our Application Specialists can help you make the right assembly choice.

UN-SURE

Temperature variation class H1 applies on component level?

YES

**GOOD TO KNOW**

Temperature and humidity shocks are common for equipment mounted on the roof of (rail) vehicles, the EN 50155 defines the following temperature variation classes:

CLASS	SURROUNDING COLD AIR	SURROUNDING HOT AIR	TEMPERATURE GRADIENT
H1		No specific requirements	
H2	25°C 10°C	15°C/95 %RH 40°C/60 %RH	±3°C/s ±3°C/s

Temperature variation class H2 requires the operator to define the durations at which assemblies are subject to the temperature conditions when entering areas of surrounding hot air from areas of surrounding cold and vice versa.

Multiple system voltages (i.e. 24 V, 48 V and 110 V) in single solution?

YES

**GOOD TO KNOW**

When targeting multiple battery system voltages such as 24V, 48V and 110V within the same application, Traco Power ULTRA (12:1) DC/DC converters can reduce engineering, testing, certification and maintenance effort and ensure a short time-to-market.

Mounted on a PCB?

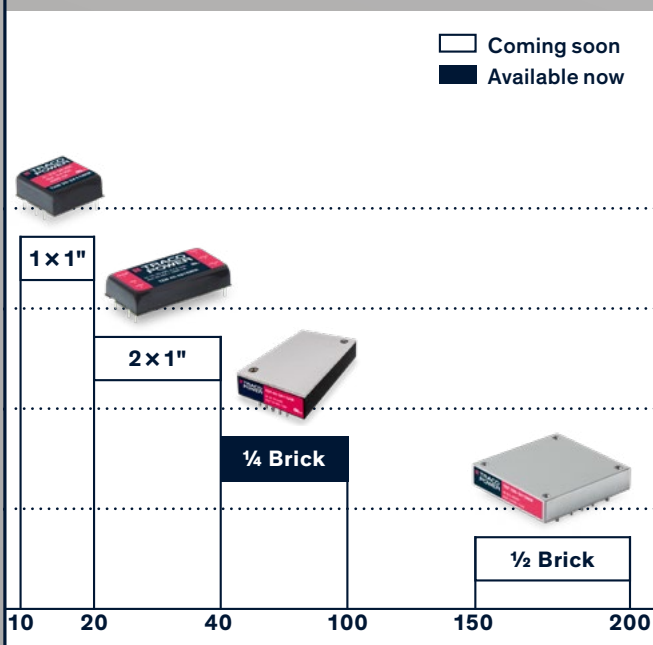
YES

NO

**12:1 ULTRA PRODUCTS**

**ULTRA 12:1 PCB-MOUNTED DC/DC CONVERTERS FOR RAILWAY & RUGGEDIZED**

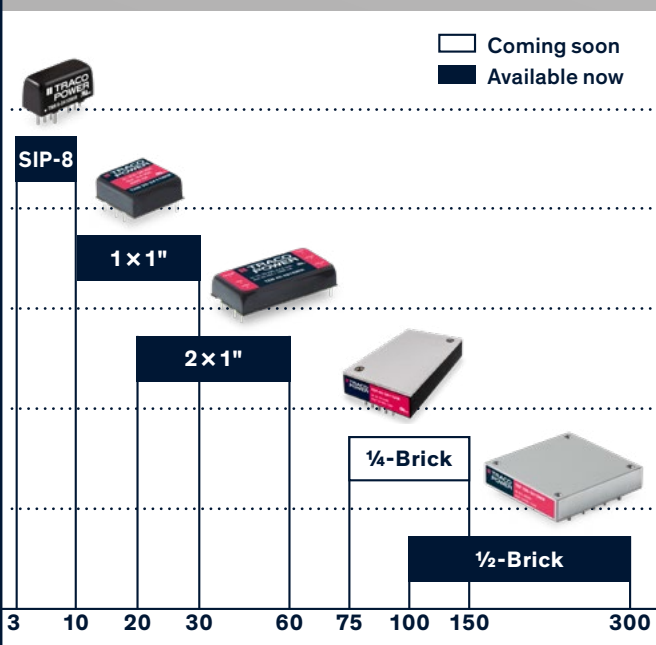
PCB mounted Railway & Ruggedized ULTRA (12:1) converters reduce total costs of ownership and time-to-market. Application engineers no longer need to create different design channels and assembly options for different input voltage requirements of the same device.



**PCB MOUNT PRODUCTS**

**WIDE 4:1 PCB-MOUNTED CONVERTERS FOR RAILWAY & RUGGEDIZED**

PCB mounted Railway & Ruggedized converters with wide (4:1) input voltage range offer industry leading value in terms of reliability, thermal performance,



**CHASSIS-MOUNT PRODUCTS (NOT ON A PCB)**

**WIDE 4:1 PCB CHASSIS-MOUNTED CONVERTERS FOR RAILWAY & RUGGEDIZED**

Traco Power offers a range of standard chassis mounted Railway & Ruggedized DC/DC converters with wide (4:1) input voltage range.



Contact sales

Receive design-in support

**GOOD TO KNOW**

Our Application Specialists are ready to support you in the early phase of your design. Support may include but is not limited to

- Choice of components
- Regulatory requirements
- Special requirements for volume production

Receive samples

**GOOD TO KNOW**

Contact your Traco Power Sales Representative or Application Specialist today and receive free samples from thousands of products in stock at our central warehouse in Switzerland.

Engineering

**GOOD TO KNOW**

Our Technical Support team is happy to assist you with overcoming specific engineering challenges. Contact your Traco Power Sales Representative or Application Specialist and receive free Technical Support for all Traco Power Products.

Start of production