



Railway application DC/DC Converters 30 to 2000 W



TRAIN DC/DC CONVERTERS 30 TO 2000 W

Polyamp has continuously supplied switch mode DC/DC converters to the international railway industry since 1973. Therefore the company has the capability to meet performance requirements of worldwide applications and to accommodate the extreme environmental demands of hot and humid Bangkok, hot and dry Australia and the arctic north of Scandinavia.

Railway System Applications

All Polyamp DC/DC Converters for railway applications are designed to safe, technically compliant, reliable and cost effective. Applications include systems for surface and underground trains powered by both electric and diesel locomotives, trams and special vehicles used by the operators and maintainers as well as track side fixed installations. Systems can be categorised as:

Train systems

Systems used by the driver are specifically safety demanding and a fault will either stop the train or automatically revert it to an alternative fail safe mode.

- Driver computer
- Train control
- Remote control
- Emergency starting
- Radio
- Head and backlight (Xenon/Halogen/LED)
- Alarms (Bells/Horns)
- Wipe washers
- Cameras

Passenger comfort systems

- Displays and information
- Lamps (Halogen/LED)
- IT-equipment's
- Sound/Communication
- Toilets
- Coffee and Restaurant

Railway operating systems

- Counting devices, ticketing
- Remote control
- Cameras
- Doors
- Lifts including disabled facilities

Train logistics

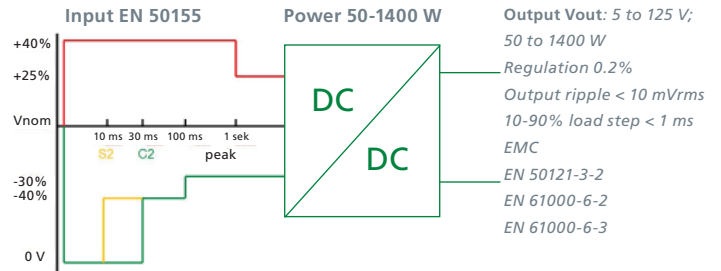
Polyamp's experience of successfully completing deliveries into train industry include:

- New trains with just-in time deliveries
- Adding a feature to a fleet
- Track side equipments
- Train refurbishments
- Special equipments

These markets do not need large bulk quantities and Polyamp has a proven record, which is recognised by its customers, of delivering not only within time but on the agreed date.

DC/DC converter in train applications

The obvious function of a DC/DC converter is to transform a DC input to another DC output. However a Polyamp DC/DC converter also stabilizes the output voltage, provides galvanic separation between input and output as well as acting as filter on both the input and output voltage. When the output voltage is distributed it must have good filters to avoid interference.



Input Vin: 10 to 300 Vd.c
 S2, C2 optional
 Input ripple < 10 mVrms
 Reverse voltage protected
 EMC
 EN 50121-3-2
 EN 61000-6-2
 EN 61000-6-3

Galvanic separated in/out
 Temp. Range -40 to +85°C
 Conduction cooled
 20 years operation
 Design EN 50155
 Fire and smoke EN 45545-2
 EMCEN 50121-3-2
 EN 61000-6-2
 EN 61000-6-3

A DC/DC converter can be used to supply single equipment or supply a bus voltage for several equipment's. Polyamp also provides Secure systems with fault redundancy using centralised cabinets or distributed in the train. The Polyamp product range covers from 50 to 1400 W in single units and several kW in system solutions. We handle the input common in train industry defined by EN 50155 also higher voltages for tram and trolley buses defined by IEC 60850



Two units PM500 mount as 19"



Five units PM500 mount as 19"

Key Features

- Single outputs 3 to 125 V
- 2 to 3 outputs 5 to 60 V
- Inputs 10 V up to 750 Vdc
- Sturdy mechanics, meets mobile requirements.
- Easy robust mounting:
 - DIN, Wall, Chassis and 19"-rack
- Convection cooled with operating temperature range -25 to +70 °C with or without derating.
- Conformal coating standard or optional
- High efficiency
- Safety compliant with EN60950
- MTBF > 600 000 h @ +40 ° C.
- RAMS Useful life > 20 years

Train Standards

Polyamp DC/DC converters are designed to meet the railway specific standards for electronic equipment on-board trains including those specified in EN 50155 and IEC 60571. They are mechanically rugged for reliable operation in a very harsh environment throughout their whole lifetime. Where these standards specify different levels for particular conditions, applicable ratings will be confirmed and agreed for individual customer applications. An additional benefit of the Polyamp DC/DC converters is that when they are used as a power source for equipment's, that in themselves are not compliant with the EN50155 and IEC60571 standards, our DC/DC converters effectively function as a filter and galvanic separation to shield those equipment's. This allows the railway operator to use Commercial of the Shelf (COTS) equipment.

RAMS

Our DC/DC converters are designed to meet 20 years as specified in EN 50155 and IEC 60571 standards.

ISO 9001:2008

Polyamp is third party certified with extension 1E for Nuclear Power Plants. We are not certified according to IRIS as we judge not relevant for our type of product. We do not design the trains or install and service our units onboard or at a depot.

Input voltage range DC/DC Converters

EN 50155 and IEC 60571 specify a nominal input variation of $\pm 30\%$ including ripple. During shorter periods some other specifications define $\pm 40\%$ or more, see figure. For modern trains with better DC supply systems they can be relaxed. In other cases the input range can be made wider e.g. Italy or France as well as for markets still using RIA12 specifications to meet its surge requirement of 3.5x nominal input voltage.

The figure summarise in relation to voltage and time domain, the different input requirements described in the standard for DC inputs.

The optional S2 and C2 require series diode on the input, which is not standard on inputs < 110 Vd.c. (Nom).



PM50 / PM80

PSC100 - 240

PSE100 - 250



PSC400, PSC600, PSC800



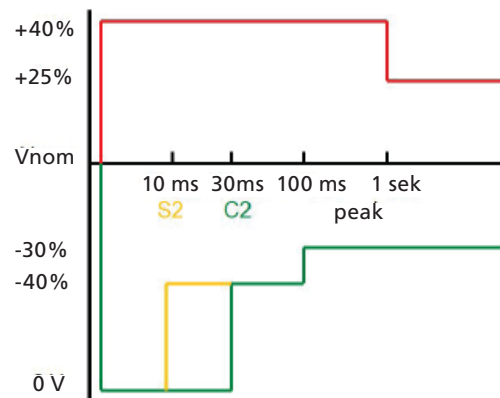
PM500



PC1000, PC1400, PC2000



PU600 / PU1000



ENVIROMENTAL SPECIFICATION

EMC

Compliant with the EN 50121-3-2 (IEC 62236-3-2) EMC performance specified for electronic equipment's. It should be noted that the requirements are in some part less stringent than the Basic standards for Industrial applications that Polyamp meets. The Emission levels are also well above Basic standards which in some cases creates interference. Polyamp DC/DC converters have very low noise, still highly immune against external disturbances. We are also compliant to trackside EN 50121-4 (IEC 62236-4).

Ambient temperature

The standard level is -25 to +55 °C but most applications specify -25 to +70 °C (T3). Polyamp DC/DC converters can be supplied to operate in temperatures from -40 to +85 °C 10 min due to our thermal inertia in our rugged cases.

Shock and vibration

Compliant with the IEC/EN61373 requirements for body mounted class B. Polyamp DC/DC converters are regularly used in military vehicles and fork lifts, which have more severe vibration requirements.

Fire and Smoke

We certify our units as "Non-listed product" < 100g, meeting HL3 level, this according to EN 45545-2:2013.

Relevant experience

With more than 40 years' experience in developing and production of DC/DC converters Polyamp has established a reputation for quality, reliability and on time deliveries. Polyamp DC/DC converters have been used in a wide range of applications:

- Electrical Vehicles
- Trains and Track Side
- Process Control
- Power Plants (including nuclear)
- Power / DC Distribution
- Telecom
- Radio com
- Industry
- Naval
- Air Traffic Control
- Military
- Radio applications

THE COMPANY

Polyamp is privately owned business located in Sollentuna, Stockholm, Sweden, with production facilities in Sweden in Åtvidaberg some 240 km south of Stockholm and in Switzerland in La Chaux-de-Fonds. Established for nearly 50 years, the company has developed from National Contractor to its present status of an "International Supplier of high quality Power Electronic equipment".



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