

# PBX Battery Chargers for Rail and Mass Transport Systems



- ◆ **Standard PADS approved chargers based upon well proven technology for UK railway applications**
- ◆ **Special railway chargers systems based on the PADS approved products**
- ◆ **Custom variations for underground and mass Transport projects**
- ◆ **Rugged industrial design**
- ◆ **Compliant with rail industry standards**
- ◆ **Single and three phase input variations**



PB Design have been supplying charger systems designed specifically for use in railway and mass transit systems for over 30 years. For railway applications the range comprises standard PADS approved charger systems and variations based on these standard PADS products that are customized to meet specific rail project needs.



# PBX Battery Chargers for Railways and Mass Transport

- ◆ **Output voltages: 24, 30, 48, 60, 110, 220V**
- ◆ **Single and three phase**
- ◆ **Current ratings from 2A to 300A**
- ◆ **Thyristor (SCR) based for high reliability and long design life (>20 years)**
- ◆ **Compatible with lead acid and nickel cadmium batteries**
- ◆ **Digital meter showing voltage or current**



## Flexibility Through Design

PB Design have been supplying charger systems designed specifically for use in railway and mass transit systems for over 30 years. For railway applications the range comprises standard PADS approved charger systems and variations based on these standard PADS products that are customized to meet specific rail project needs. Mass transit and Underground products are designed to fully comply with the industry requirement and particular customer specifications.

The design of these chargers is of the constant voltage type and as with all constant potential charging systems the battery charge current will vary according to the battery demand as determined by its state of charge/discharge.

If the battery has been discharged following a mains failure the charge current on restoration of the mains would be proportionally high in the first instance and reducing thereafter as the battery recovers and its terminal voltage rises.

To safeguard the charger from such high current demand and to optimise the rating of the charger, current limiting circuitry is included within the system, due to industry requirements the level of this is application specific.

The charger characteristics changes from a current limited, constant current type at low battery voltage to a

variable current, constant potential type as the battery voltage recovers to its fully charged state. When fully charged the battery is maintained constantly at its float voltage level while the charge current is reduced to a level sufficient to offset system losses and maintain the battery in a fully charged condition.

### Monitored Alarms Include:

- ◆ Battery CB trip
- ◆ Charger CB trip
- ◆ Boost indication
- ◆ Mains healthy/failed
- ◆ Charger healthy/failed
- ◆ High volts
- ◆ Low volts
- ◆ Earth fault
- ◆ Battery fault

### Product Features:

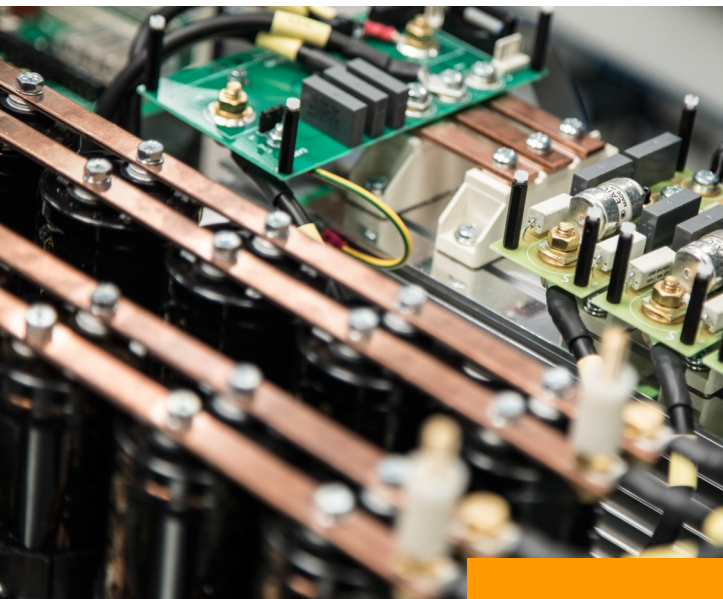
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- ◆ Earth fault
- ◆ Battery fault



## General Application Considerations

In order to ensure that the correct charger system is selected to meet your requirements the minimum information needed is as follows:

- ◆ Nominal DC system voltage;
- ◆ Minimum and Maximum voltages allowed;
- ◆ The standing load ;
- ◆ Autonomy required, the number of hours the system is to support the standing load after a mains failure;
- ◆ The transients load's and duration;
- ◆ Is the system to support circuit breaker operation with the battery disconnected?
- ◆ Battery technology required;
- ◆ The maximum time required for battery recharge in order to repeat the load duty;
- ◆ The anticipated frequency of discharge imposed on the battery, i.e.: the charge/discharge cycling requirements;
- ◆ The ambient operating/design temperature: maximum, minimum, average;
- ◆ Any input supply limitations.



## PB Design product ordering code:

**PBX15 48 40A MAU EFA 10DB20A SL200 1941**

### SERIES/MODEL

**PBX15: Single Phase Charger in Cubicle**

**PBX35: Three Phase Charger in Cubicle**

### SYSTEM VOLTAGE (OUTPUT)

**48: 24, 48 or 110VDC**

### CHARGER RATING\*

**40A: Charger Output Current in Amps**

### OPTIONS

**BSI: Battery Monitor (battery disconnected)**

**EFA: Earth Fault Alarm**

**LVD: Low Voltage Disconnect**

**MAU: Multiple Alarm Unit**

### DISTRIBUTION\*

Quantity ways	Ratings	Type
10DB	20A	DP Fuses
Alternative:		
10DB	32A	MCB (DP MCB)

\*(Any distribution available, please contact us)

### BATTERY\*

**SL200: Sealed Lead Acid to BS6290 part 4**

**NiCad: Nickel Cadmium cells**

\*(Stated in Ampere Hours at the 10 hour rate of discharge)

### CUBICLES

**1941: H x W x D (mm): 1961x 600 x 650**

**10: H x W x D (mm): 1961 x 750 x 650**

**6x: H x W x D (mm): 1755 x 750 x 455**

**6: H x W x D (mm): 1255 x 750 x 455**

## Nomenclature:

**Example:** The PB Design product code can be found on the serial plate and indicates the main features of the product. Also if the serial number is provided to us we can produce a direct replacement unit. The features of the product example below is as follows:

Single phase input, 48Vdc output, 40A maximum, Battery Monitor and Earth Fault Alarm contacts, 10 ways 20 fuses distribution, sealed lead acid batteries.

## Technical Specification

DC Current rating	6A	10A	16A	20A	25A	30A	40A	50A	60A	75A	100A	125A	150A	200A	250A
AC Input Voltage and Frequency	230V ± 10% 50Hz, 3x400V ± 10% 50Hz. Other on request														
Input Power Factor	> 0.8 Inductive														
Nominal Output Voltages	24 / 48 / 110 VDC														
Float Voltage Range	100-125%														
Boost Voltage Range	100-135%														
DC Voltage Output	± 1%														
Tolerance	Maximum ± 1% Vrms, ±2% within 100ms														
DC Ripple Voltage	< 1% without battery connected (other designs are available upon request)														
Noise Level	≤ 55db														
Efficiency	80%														
Operating Temperature (°C)	-10 to +50 °C														
Storage Temperature (°C)	-30 to +80 °C														
Maximum Altitude (m)	1000 m														
IP Rating	IP21 to IP54 available														
Relative Humidity	> 95% non condensing														

## Applicable Standards

Standard	Rail Systems	Underground Systems	Mass Transit Systems
Commercial specification	RTS21041	S1947	Tailored to Project
Conformity	PA05/01939 & PA05/02624, LVD 2014/35/EU, NGC Type registration category A		
EMC	Directive 2014/30/EU		
Approval	PADS	London Underground	-
Safety	IEC/EN 62040-1		
Performance	IEC/EN 60146-1-1, IEC/EN62040-5-3		
Quality	ISO 9001:2015		
Environment	ISO 14001:2015		
Other	Achilles certificate no 029428, UK Rail Industry RISQS certificate no 1591		