Your Expert Partner for **Human Machine Interfaces**

Charging Solutions
Mobile Device Charging.

www.eao.com/charging

The Connected Passenger

Charge. Connect. Communicate.

In our digital world the ability to connect people, *smart devices and machines is a prerequisite to flawlessly access information and services.*

EAO's Charging Solutions incorporate the latest technology innovations and are specifically designed for public transport applications. Passenger surveys show that today's travelling public demand a charging service for their portable devices to ensure they can remain connected during their journeys.

Responding to the needs of passengers during their travel experience can influence their choice of transportation method. Train operators striving to increase passenger numbers and expand ticketing revenues are mindful of the role of an enhanced passenger experience.

The travelling experience is enhanced if passengers can keep their devices charged and remain connected during their journey. A device charging service can reduce the stress associated with 'low-battery anxiety'.

EAO's range of charging solutions has been developed to allow an individual charging service to every seat and table. Wireless charging options allow phones and other accessories to be charged without the need for a charger adaptor or cable, whilst EAO's high-power USB-C power delivery system will charge phones, tablets and modern laptops.

The whole charging infrastructure could be monetised through the branding of chargers with a prominent sponsor's logo or by the marking of chargers with a custom URL that gives passengers a weblink to access special offers.

EAO, a leading supplier to the global rail industry, has continuously designed and supplied project solutions to train builders and operators since 1947. Reliable products, engineering support and long-term spares availability make EAO your Expert Partner for HMI.

Further information is available at
https://eao.com/charging

Tabletop mounted wireless charger with USB charger and SliderFLEX seatback chargers.

SliderFLEX and USB-C Power Delivery / PPS Multi-voltage laptop charger.


eao
HMI Systems for transportation.
HMI Systems for transportation.

Charging Solutions
Mobile Device Charging.

EAO's railway certified Charging Solutions help train operators to enhance the passenger experience by allowing passengers to charge their phones, tablets and laptops, on the move.

The connected passenger
Passengers are busy multi-tasking whilst travelling – using their devices for messaging, entertainment, calls, shopping and working.

Passengers may need to charge phones, laptops, tablets, and headphones on their journey, so they highly value on-board charging. It can help them stay connected to the internet, their friends, family and colleagues. They see it as an important factor in the quality of their passenger experience.

Intensive daily use means that mobile devices will often lose charge on a journey and phone charger cables can be lost, become broken or simply forgotten. This can add to travellers' stress and cause low battery anxiety, especially if their ticket is stored on their phone.

EAO chargers can be fitted to tables, seatbacks, walls and even grab poles to provide a phone charging service to nearly every passenger. With the new multi-voltage Power Delivery/PPS USB-C sockets, EAO can also provide laptop and fast charging for phones through one connection.

Is the future wireless?
The share of mobile devices with wireless charging technology is growing. Phones can be wirelessly charged through the Qi inductive charging system for iOS and Android phones.

Most new phones have built-in wireless charging, so wireless is key to future-proofing any new charging infrastructure installed in the carriage. The location of the wireless charging receiver within each phone model is not standardised, so EAO's SliderFLEX and seatback phone chargers use a multi-coil arrangement to ensure all phones can be charged regardless of the position of the charging receiver.

EAO's Passenger Charging Solutions can give every passenger access to convenient, reliable device charging. The range includes both wireless chargers and standard USB-A or USB-C sockets. The multi-coil wireless chargers overcome issues with phone placement on the wireless charging transmitter especially when mounted in seatbacks and grab poles.

EAO charging solutions can be installed in different areas across the train carriage.

- **Tabletops and counters**
  Round single coil chargers mounted from the top, or rear mounted from the bottom with separate additional table edge USB-A/USB-C sockets.

- **Seatbacks**
  SliderFLEX multi-coil wireless charger for airline-style seats with portrait/landscape viewing and additional USB-A or USB-C charging socket.

  USB-C Power Delivery socket – High power 60 W output, 5 V – 20 V seatback mounted module with PPS/PD 3.0 compatible voltage detection for phone and laptop charging.

  Rectangular multi-coil 10W wireless charger with USB-B charging socket for integration into a customer's own bespoke design of seatback charger holder.

- **Seat dividers**
  Round single coil, rectangular multi-coil chargers and USB-C socket chargers integrated into the seat.

- **Side walls, partitions, and bulkheads**
  Multi-voltage high-power USB-C sockets for phones and laptops that can replace traditional 230 V sockets.

- **Grab poles**
  Wireless multi-coil phone holder charger mounted on to grab poles for commuter services with standing passengers.

Wireless charging is perfectly safe
EAO chargers have been tested in accordance with EN 62311:2008 Assessment of electronic and electrical equipment related to human exposure for electromagnetic fields and presents no health hazard, even to people with pacemakers, or other medical implants.

Benefits to the public transport operator.

- Clear enhancement to the passenger experience and the operator's image
- Can be retrofitted during refurbishment or as a separate upgrade
- Unique seatback mounted USB-C Power Delivery socket for phones and laptops
- The SliderFLEX wireless seat back chargers accept most modern smartphones
- Generate revenue from sponsorship with physical branding of logos or URL's on chargers

Improve the passenger experience
Surveys show that train travellers value a charging service for their devices, so they can continue to use them on the journey, without the worry of losing charge.

Generate revenue
The seatback SliderFLEX and table mount surface mount chargers can be branded with a sponsor's logo, or with a special offer URL to generate revenue for the train operator.

Refurbish and retrofit
With a SliderFLEX seatback charger, a tabletop charger and a USB-C multi-voltage socket, EAO can work with seat and table partners to produce mounting plates and tailor the product design to fit and match to the public transport operators' seats and tables. The chargers can also be fitted to grab poles and partitions for high density commuter applications.

A comprehensive product range
Seatback chargers can give passengers, even those in air-line style seating, access to device charging. The Slider-FLEX securely holds the phone during inductive charging and also allows charging through the auxiliary USB socket. The Intelligent high power multi-voltage USB-C sockets provide laptop charging and can also replace 230 VAC outlets resolving safety concerns from the misuse or over-loading of the AC supply.

The table mounted round chargers are either sub-mounted under the decorative surface of the table or mounted from the top using the Surface Mount Adaptor. The 10 W versions can charge at up to 2 A inductive or 2 A USB on a single device, or charge two devices each at 1 A.

Power convertors
Rail industry approved AC/DC or DC/DC power supplies with IP40 or IP65 sealing and two or four output chargers with 12 V outputs for 10 W chargers.

Multi-voltage high power 5 V to 20 V output power convertors supporting PD 3.0 and PPS for USB-C intelligent charging sockets. All connection cables are available for easy inte-gration of the charging system.

USB-C multi-voltage socket
Safely replace 230 V outlets with high power USB-C

Tabletop single coil charger
10 W/15 W power output

Surface Mount Adaptor
10 W/15 W output

Twin USB Output PD and PPS multi-voltage power supply

Seatback SliderFLEX
Aluminium housing with sliding phone clamp

Rectangular multi-coil version
10 W power output

Twin USB Output Power Supply AC or DC Input

Benefits to the passenger.

- Charge phone without the inconvenience of carrying plugs and cables
- Opportunistic charging to avoid ‘low battery anxiety’
- Charge phones, laptops and tablets with a USB-C cable and no power adaptor
- Use portable devices on their journey without the need to conserve charge

A charging service for all their devices
Passengers can charge all their mobile devices whilst travelling. Their phones can be charged without the need for a cable, or a charging adaptor ensuring they can always present their e-ticket for inspection onboard, or at barriers.

Convenient, reliable, available
EAO passenger phone charging system offer convenient charging with, or without a USB-cable for a charging service wherever the passenger is seated. The SliderFLEX seatback chargers gently, but securely hold the phone in landscape or portrait orientation and can still show up to 90 % of the screen area.

Laptop charging without a power adaptor
The power delivery PD3.0/PPS USB-C sockets can charge modern laptops and offer fast charging for mobile phones using just a cable and without the need for a charging adaptor and 230 VAC socket.

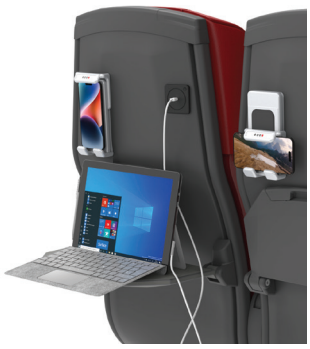
Ticketing and special promotional offers
Chargers can be branded for sponsors with their logos or special offer URL’s. This could allow passengers to get discounted tickets or access special promotional offers such as discount codes related to services they may need during their journey.

Charge it and use it
No need to conserve power, passengers can continue to use their phones and laptops whilst they are provided with a charging service . They can stay in touch, and keep entertained without low battery anxiety.

Ticketing
Your phone is your ticket – it must be charged.

Special offers
Discounted travel tickets or discount codes.

Laptop charging
Charging up to 60 W with no plug-in adaptor.



Specifications and dimensions
Seatback SliderFLEX version.

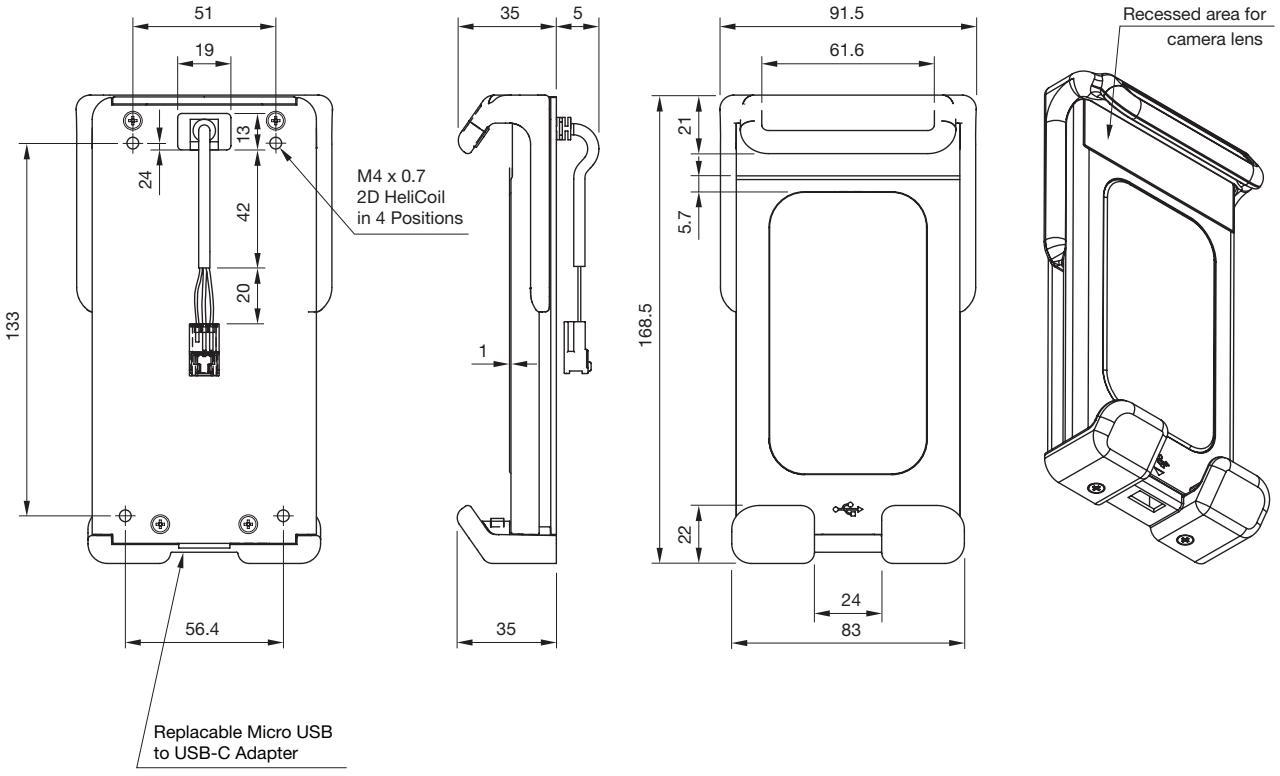
Mechanical characteristics
- Durable powder coated standard RAL 9006 white aluminium or custom coloured housing
- Soft-touch, multi-coil charger
- Sliding cushioned phone clamp
- Micro USB-B power input and USB-C power output socket

Name	Part No.
Seatback SliderFLEX 10 W	PIF-01SF-010

Electrical characteristics
- Power consumption 10 W
- Input voltage 10 W version: 9 V – 12 V +0.5
- Maximum output current 2.0 A at 5 V
- Maximum inductive charging current 2.0 A

Standards and certifications
- Qi Certified
- EN 50121-3-2 Railway Apparatus
- EN 62311 Human exposure to electromagnetic fields
- EN 61373 Rail vehicle vibration
- EN 45545-2 Fire protection of railway vehicle – Part 2

Dimensions (mm)



Specifications and dimensions
USB-C Power Delivery Socket.

Mechanical characteristics
- Custom plastic front plates with security screw fixings
- Twin USB-C sockets
- Rear mounted serviceable sockets
- Front USB plate swappable from front panel
- Straight, or low depth right angle mating sockets

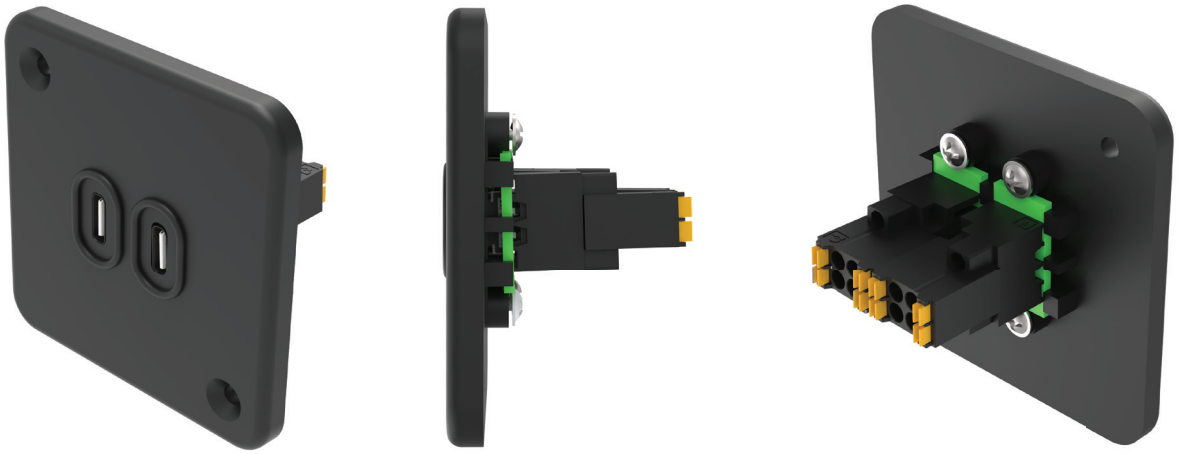
Electrical characteristics (when used with a Power Delivery AC PSU)
- Power consumption up to 120 W (2 x 60 W)
- Output voltage 5 V default up to 20 V with a PD cable
- Maximum output current 3.0 A per output
- Automatic output voltage switching via software handshake

Standards and certifications (when used with EAO PD AC PSU)
- USB Power delivery Rev 3.0
- PPS (Programmable Power Supply)
- EN 50121-3-2 Railway Apparatus
- EN 61373 Rail vehicle vibration tested
- EN 45545-2 Fire protection of railway vehicle – Part 2

Name	Part No.
USB-C PCB assembly straight	USB-C-STC
USB-C PCB assembly right angle	USB-C-RHC

Note
A compatible PD 3.0/PPS power supply is also required for a multi-voltage charging system.

Product views



Specifications and dimensions
Round table top single coil version.

Mechanical characteristics
- Soft-touch rubber coated single coil charger
- Micro USB-B power input and output socket 10 W
- USB-C power input and signal output socket 15 W

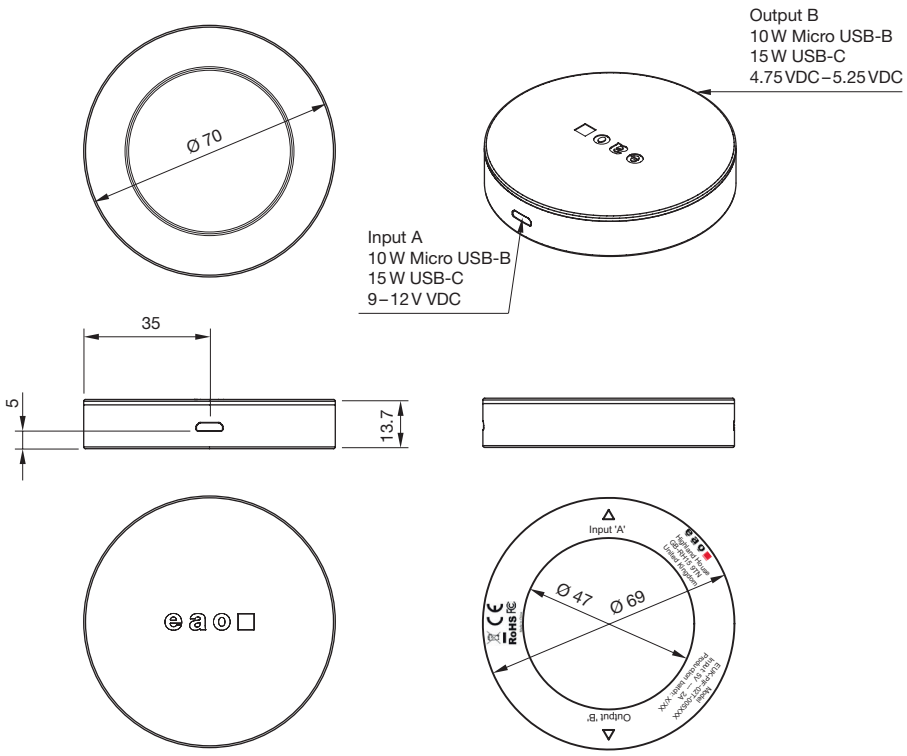
Electrical characteristics PIF-02T-010
- Maximum power consumption 10 W
- Input voltage 10 W version: 9 V – 12 V + 0.5 V
- Maximum output current on USB 10 W version 2.0 A
- Maximum inductive current 10 W version 2.0 A

Electrical characteristics PIF-02T-015
- Maximum power consumption 15 W
- Input voltage 15 W version: 9 V – 12 V + 0.5 V
- Maximum inductive current 15 W version 3.0 A
- Output USB socket charging status for external LED
- LED drive output signals: ready to charge, device charging, foreign object detected error

Standards and certifications
- Qi Certified
- EN 50121-3-2 Railway Apparatus
- EN 62311 Human exposure to electromagnetic fields
- EN 61373 Rail vehicle vibration
- EN 45545-2 Fire protection of railway vehicle – Part 2

Name	Part No.
Round table top single coil 10 W	PIF-02T-010
Round table top single coil 15 W	PIF-02T-015

Dimensions (mm)



Specifications and dimensions
Rectangular multi-coil version.

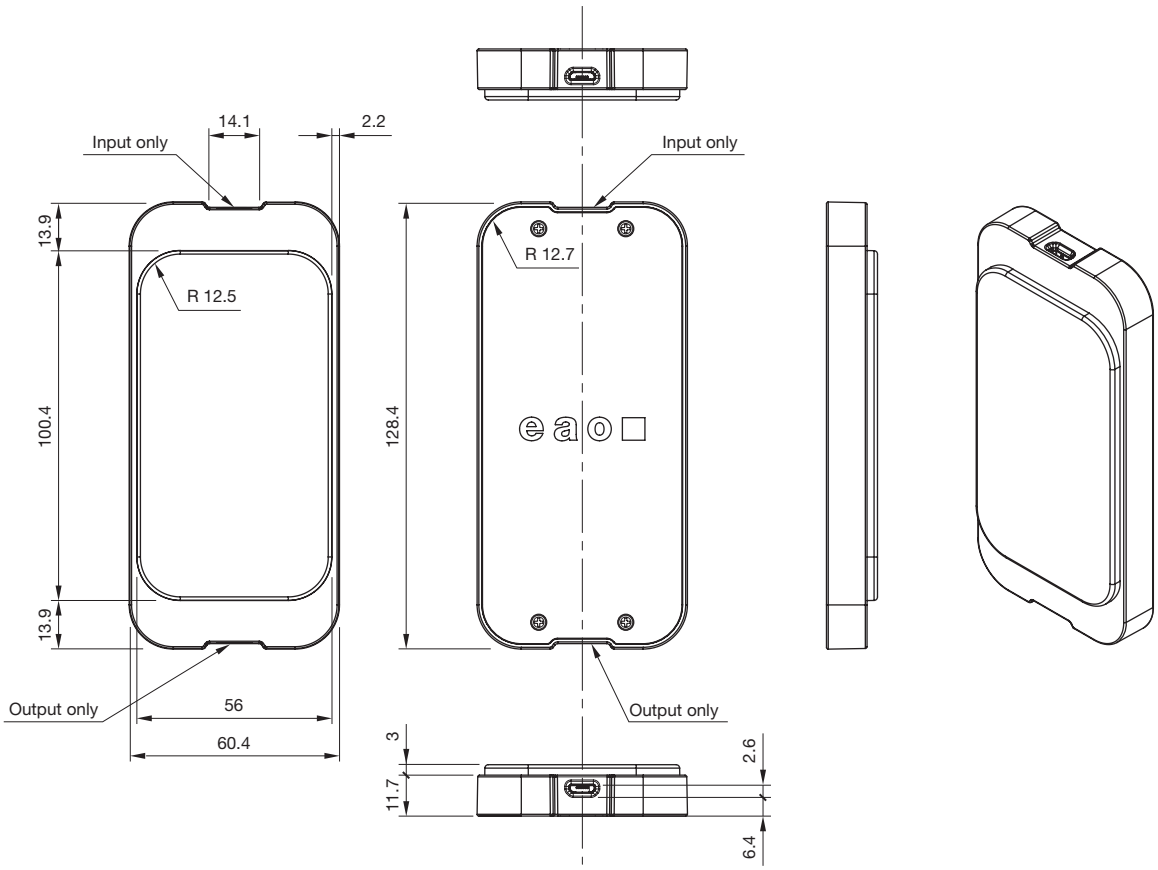
Mechanical characteristics
- Soft-touch multi-coil charger
- Micro USB-B power input and output socket

Name	Part No.
Rectangular multi-coil 10 W	PIF-03S-010

Electrical characteristics
- Power consumption 10 W
- Input voltage 10 W version 9 – 12 V +0.5 V
- Maximum output current on USB 2.0 A
- Maximum inductive charging current 2.0 A

Standards and certifications
- Qi Certified
- EN 50121-3-2 Railway Apparatus
- EN 62311 Human exposure to electromagnetic fields
- EN 61373 Rail vehicle vibration
- EN 45545-2 Fire protection of railway vehicle – Part 2

Dimensions (mm)



Specifications and dimensions
Surface mount adaptor charger assembly 10 W.

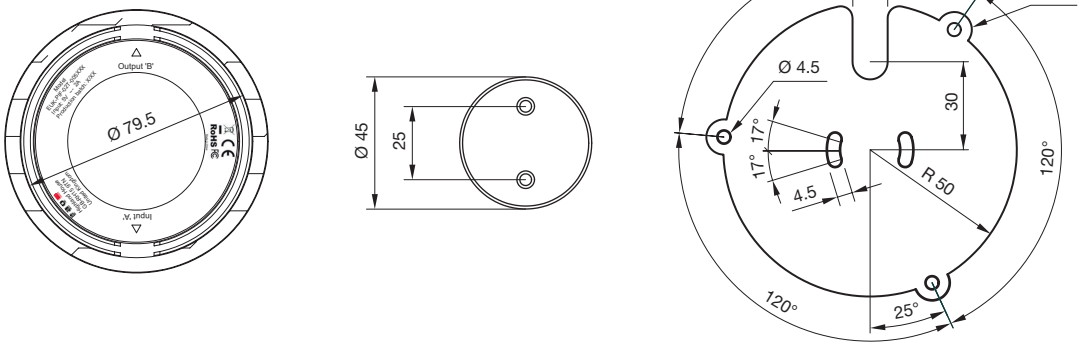
Mechanical characteristics
- Plastic body charger housing
- Threaded steel pressure plate with 3M VHB tape
- Rear clamping plate steel
- Integrated 10 W USB and inductive wireless charger
- Micro USB-B input and output sockets (optional USB-C)

Electrical characteristics
- Power consumption 10 W
- Input voltage 10 W version: 9 V – 12 V + 0.5 V
- Maximum output current USB 2.0 A
- Maximum inductive charging current 10 W version 2.0 A

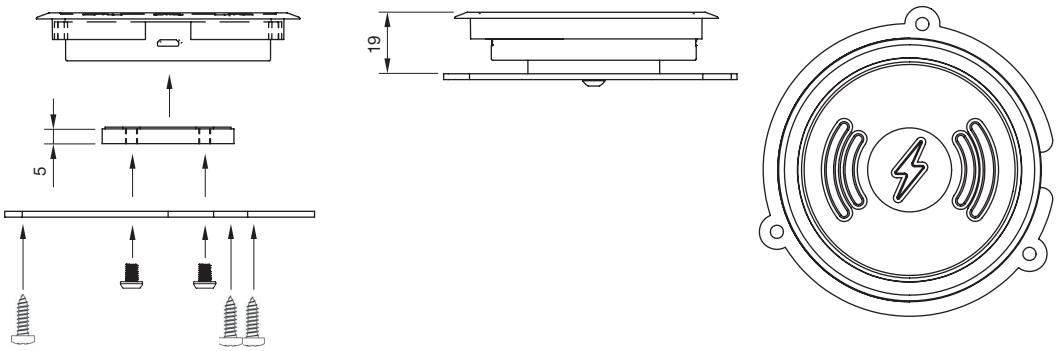
Standards and certifications
- Qi Certified
- EN 50121-3-2 Railway Apparatus
- EN 62311 Human exposure to electromagnetic fields
- EN 61373 Rail vehicle vibration
- EN 45545-2 Fire protection of railway vehicle – Part 2

Dimensions (mm)
Min. table thickness 19 mm with 2 x M4 x 6 mm max. length bolts.

Name	Part No.
Surface mount adaptor 10 W charger	PIF-SMC-010



Drawings from left to right: Rear view of SMC top housing with charger, threaded pressure plate, rear clamping plate.



Drawings from left to right: Exploded assembly drawing, mounting depth, view of assembly from the front.

Specifications and dimensions
Surface mount adaptor charger assembly 15 W.

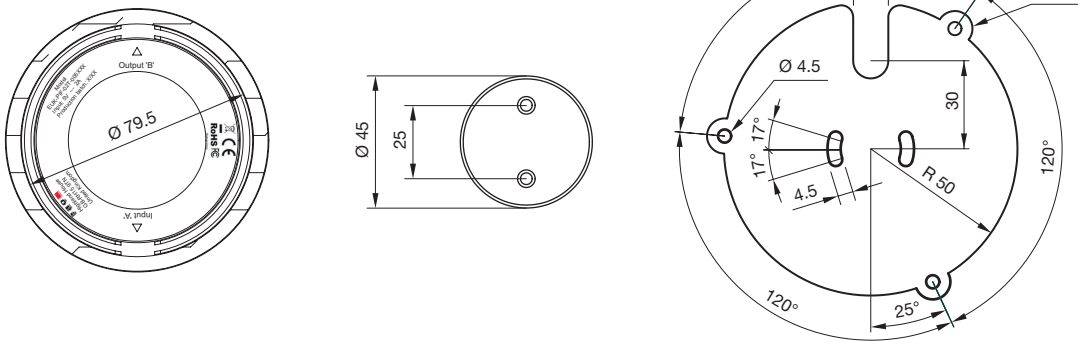
Mechanical characteristics
- Plastic body charger housing
- Threaded steel pressure plate with 3M VHB tape
- Rear clamping plate steel
- Inductive wireless charger
- USB-C power input socket
- USB-C output for charging status

Electrical characteristics
- Power consumption 15 W
- Input voltage: 9 V – 12 V + 0.5 V
- Maximum inductive charging current 3.0 A
- Three 5 V output lines for driving charging status indicator

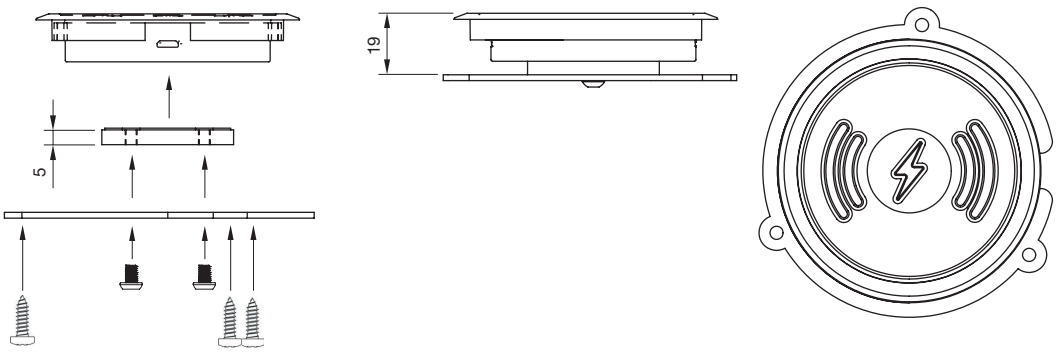
Standards and certifications
- Qi Certified
- EN 50121-3-2 Railway Apparatus
- EN 62311 Human exposure to electromagnetic fields
- EN 61373 Rail vehicle vibration
- EN 45545-2 Fire protection of railway vehicle – Part 2

Dimensions (mm)
Min. table thickness 19 mm with 2 x M4 x 6 mm max. length bolts.

Name	Part No.
Surface mount adaptor 15 W charger	PIF-SMC-015



Drawings from left to right: Rear view of SMC top housing with charger, threaded pressure plate, rear clamping plate.



Drawings from left to right: Exploded assembly drawing, mounting depth, view of assembly from the front.

Specifications and dimensions

Power supplies for chargers – PPS and Power Delivery.

The EAO USB-PD/PPS power delivery converter allows passengers to charge phones and laptops through a USB interface with a type C connector. It features two independent outputs each providing up to 60 W, compliant with the latest USB-PD Rev 3.0 and PPS specification, each output provides a voltage between 5 V and 20 V at a current of up to 3.0A. The voltage supplied to a device is negotiated between the connected device and the converter when using USB- PD cable, default output is 5 V.

Name	Part No.
AC input 110 – 230 V	PSU-110-230AC-IP40-5-20V-120W
DC input 24 V	PSU-24DC-IP40-5-20V-120W
DC input 72 – 110 V	PSU-72-110DC-IP40-5-20V-120W

Two outputs IP40 PSU.

Mechanical characteristics

- Durable powder coated aluminium housing
- Protected to IP40 against dust
- Phoenix Contact screw-in locking connectors

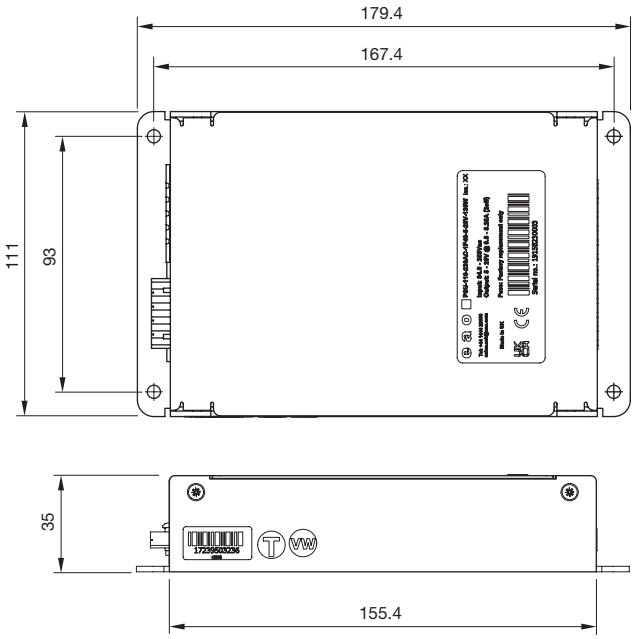
Electrical characteristics

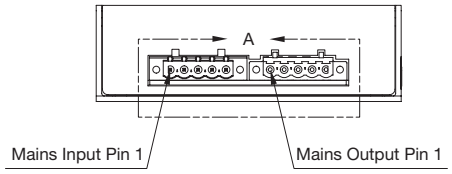
- AC Input version: 47 – 63 Hz, 90 – 253 AC
- DC Input versions: 18.8 – 33.6 V and 50.4 V – 137.5 V
- DC output fixed voltage charging mode: 5 V, 9 V, 15 V, 20 V
- DC output Programmable Power Supply: 5 V, 9 V, 15 V, 20 V
- Maximum charging current: 3.0 A
- Power output: 60 W per output maximum
- 230 V pass through output for wiring to an AC output socket
- Reverse polarity, short circuit and overvoltage protected

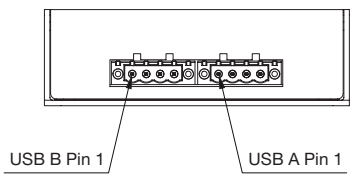
Standards and certifications

- EN50155 (2021) Electrical equipment for rolling stock
- EN 50121-3-2 Railway apparatus EMC compliant
- EN 45545-2 2020 HL3 Fire protection of railway vehicles
- EN 50153 (2014), EN 50124-1 Electrical safety
- EN 50155 (EN 61373) Shock and vibration
- USB standard PD 3.0 and PPS

Dimensions (mm)







Specifications and dimensions
Power supplies for chargers – 12 V output.

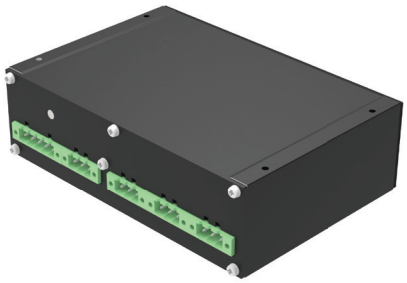
Mechanical characteristics
- Durable black anodised aluminium housing
- Protected to IP40 against dust (IP65 on request)
- Phoenix Contact connectors
- Connections: Phoenix MTSB: input 5 way, 3 way output

Electrical characteristics
- AC Input: 47–63 Hz, 90–253 AC
- DC Input: 16.8–50.4 VDC (24 V nominal input)
- DC Input: 50.4–137.5 VDC (72 V nominal input)
- DC Input: 15.8–137.5 VDC (24–110 V nominal input)
- DC Input: 66.0–137.5 VDC (110 V nominal input)
- Power output: 12.0 V, four way 48 W, two way 30 W
- Power output: 12.0 V, two way IP20 60 W

Standards and certifications
- EN 50155 Electrical equipment for rolling stock
- EN 50121-3-2 Railway apparatus EMC compliant
- EN 61373 Rail vehicle vibration tested
- EN 45545-2 Fire protection of railway vehicle – Part 2
- EN 50153, EN 50124-1 Electrical safety

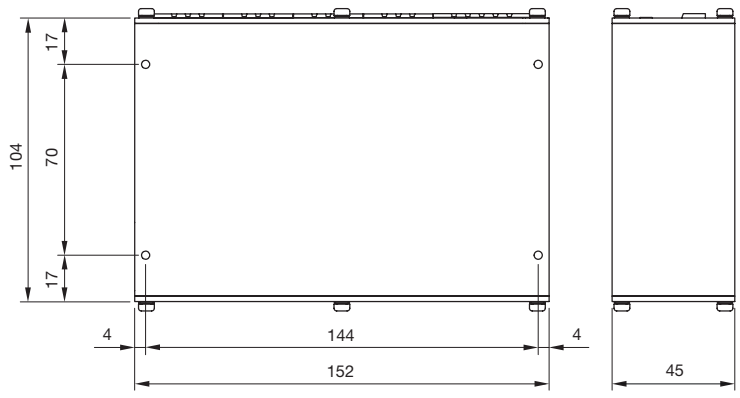
Name	Part No.
AC input 110–230 V, IP40 four outputs, 48 W	PSU-110-230AC-IP40-X4-12V
DC input 24–36 V, IP40 four outputs, 48 W	PSU-24-36DC-IP40-X4-12V
DC input 72–110 V, IP40, four outputs, 48 W	PSU-72-110DC-IP40-X4-12V
AC input 110–230 V, IP40 two outputs, 30 W	PSU-110-230AC-IP40-X2-12V
DC input 24–110 V, IP40 two outputs, 30 W	PSU-24-110DC-IP40-X2-12V
DC input 110 VDC IP20, one twin output, 60 W	PSU-110VDC-IP20-X1-12V

Two outputs IP40 PSU.

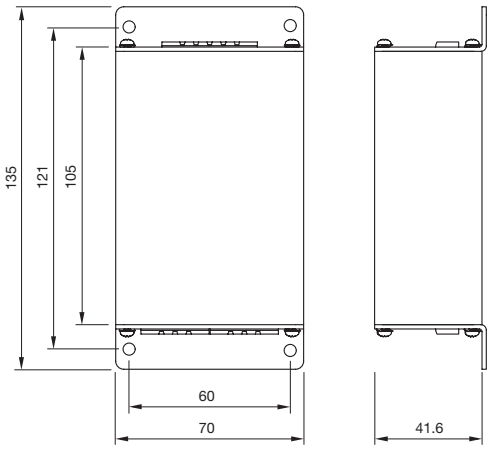


Four outputs IP40 PSU.

Dimensions (mm)



Four outputs PSU.



Two outputs PSU.

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700.067.PASSENGER.03/6.2024