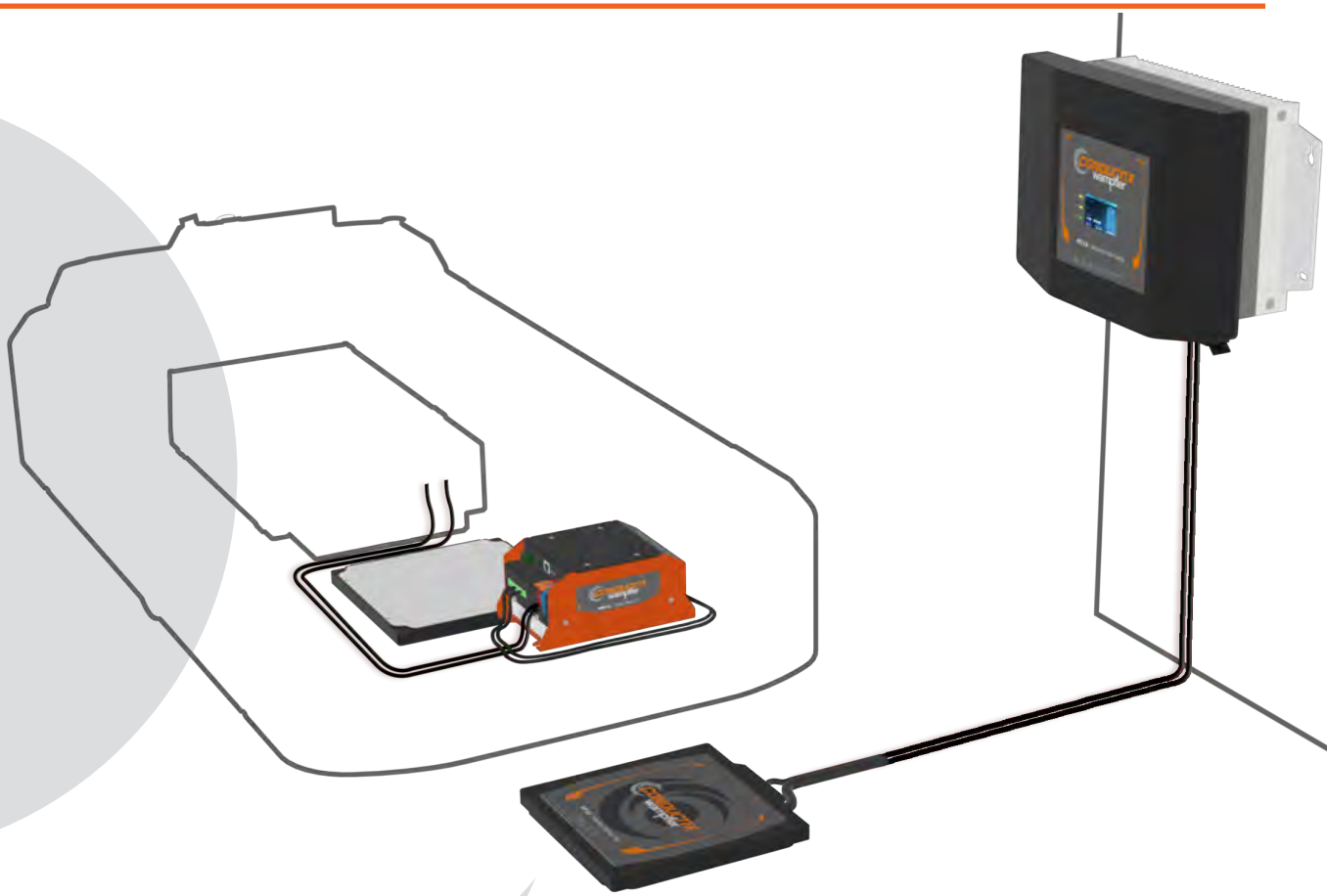
WirelessCharger 3.0

Program 9200



CONDUCTIX wampfler

The ultimate solution for

AGV
AMR
FTS
AGC
LGV
MGV
MIR
SGV
AIV

Summary of practical characteristics for WirelessCharger 3.0

Standard practical characteristics:

- Power output: 3 kW maximum, and 60 A maximum, and 59 V maximum
- Power efficiency: up to 93% output power compared to the mains input power
- Air gap tolerance: from 10 to 40 mm for maximum efficiency
- Position tolerance: +/- 25 mm for maximum efficiency
- Position tolerance: +/- 40 mm depending on air gap size
- Angle tolerance: up to 40° with 40 mm spacing

- Start time (target 60A): up to 75% of target current. Typically 5s after the Start conditions are met, in CC phase
- Start time (target 40A): up to 90% of target current. Typically 5s after the Start conditions are met, in CC phase
- Internal communication: inductive communication, not subject to any radio interference
- External communication: Ethernet, CAN 2.0B/CANopen, with several data matrix available
- Programming: User-friendly Webserver with four modes of operation

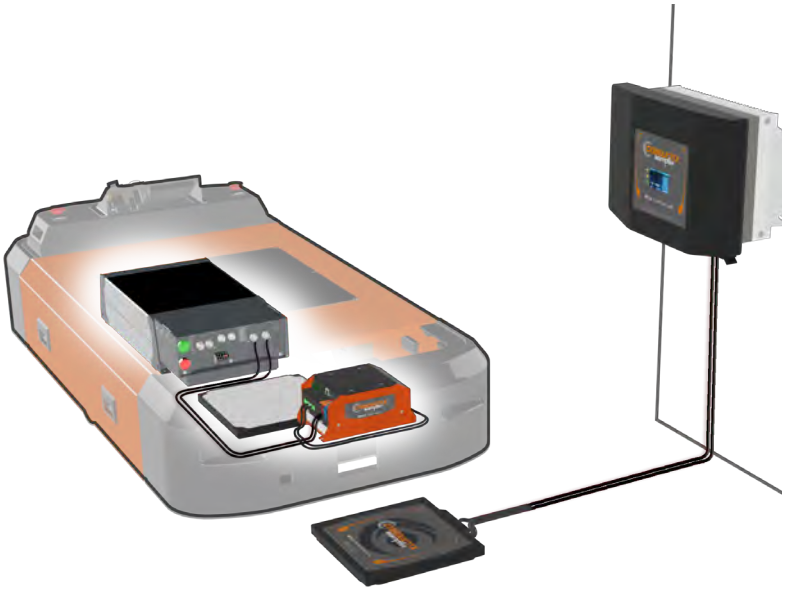
- Heat management: 100% passive cooling: electronics without a single fan, for higher lifetime
- Temp. management: Pads and battery temperatures are managed in 2 steps (warning, error)
- Charging Station Housing: IP54, can be mounted directly on the wall without the extra cost of a cabinet
- Physical interface (IPS): The charging station has a screen and a large status backlighting (to the wall)
- Physical interface (MPU): The mobile electronics has 3 LEDs to facilitate testing and commissioning
- Cable lengths: WirelessCharger 3.0 pad cables can be cut on site to the desired length

Specific characteristics that can be optimized from project to project:

- MPU size: Could be made lower by removing the heat sink if alternative cooling is available or the chassis can be used for heat dissipation. Ask for a specific version if needed.

WirelessCharger 3.0
Flexible | Reliable | Efficient

WirelessCharger 3.0 is a highly efficient power transfer system, ideal to provide electric power to charge batteries. **WirelessCharger 3.0** meets the more and more demanding requirements modern logistic solutions ask for. Offering best-in-class charging to fully automated transport solutions, being very robust, having no vulnerable contact surface, providing high efficiency, **WirelessCharger 3.0** allows highly dynamic and flexible transport solutions, with a significant time saving plug-and-play design compared to other power transmission solutions in the industry.



Applying **opportunity charging** implemented in operation processes allows typically smaller batteries and increases the lifetime of batteries by the means of short but more frequent charging sessions the lifetime of batteries, as this method of charging results in less thermal stress in the battery.

Bundling it with the **Conductix-Wampfler batteries**, specially designed and build for industrial use, is a supplementary option. Not a must, but an optional feature worth looking at for even simpler and faster commissioning processes.

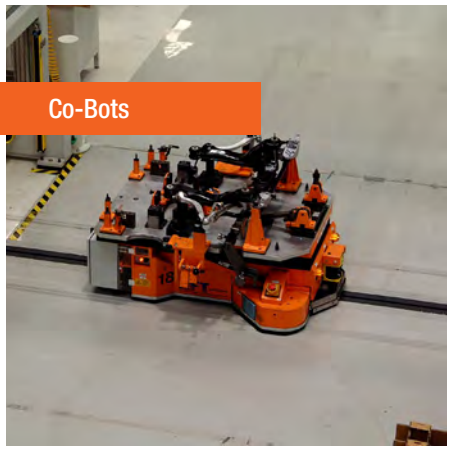
Based on experience with wireless solutions in very different applications since 1997, the option to add our supplementary industrial battery packages and supported by our global organization structures supporting our customers, a very unique bundle.

Conductix-Wampfler is comprising a long history in wireless power transfer, by the means of inductive power transfer. First charging systems were introduced to the market already more than two decades ago. Combining State-of-the-art power electronics design with excessive experience in industrial inductive powertransfer solutions has resulted in the **WirelessCharger 3.0.** Adding the expertise in batteries in the Conductix-Wampfler Group extends the solution package by optional battery packs. It is your choice and freedom to use just the **WirelessCharger 3.0** or the battery packs or use the worry-free bundle.

Automated Guided Vehicles

Mobile Service Robots

Co-Bots



Shuttle-Storage

WirelessCharger 3.0
A short introduction

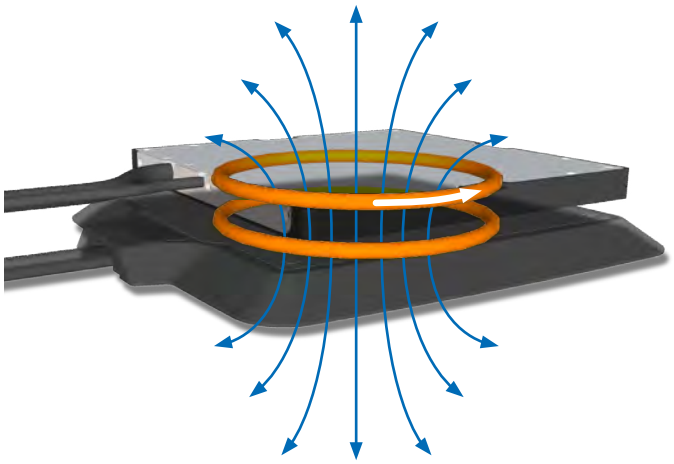
Principle

It always looks like a wonder, that power is transferred through air. But the principles are known since a long time. Faraday and Maxwell are just two of the scientists working out the basics. Nikolas Tesla was, in addition to his breakthrough works on electrical motors and AC grid systems, famous for his works on wireless power transfer. While he looked on power transfer over large distances, the **WirelessCharger 3.0** focuses on distances defined by the operation practicability on vehicles served. Magnetic fields are designed and optimized for typical air gaps and are confined so near the active coils.

The principle is very close to transformers. To gain flexibility and the capability to move away the core applied in transformers to link the coils is naturally a no go. Applying higher AC frequencies, it is possible to overcome the absence of the core and transfer power efficiently over air gaps.

Power electronic units are needed to convert low frequency mains current on the stationary side and to provide a stable DC output on the vehicle side. It is not rocket science at all, when you know what you need to do.

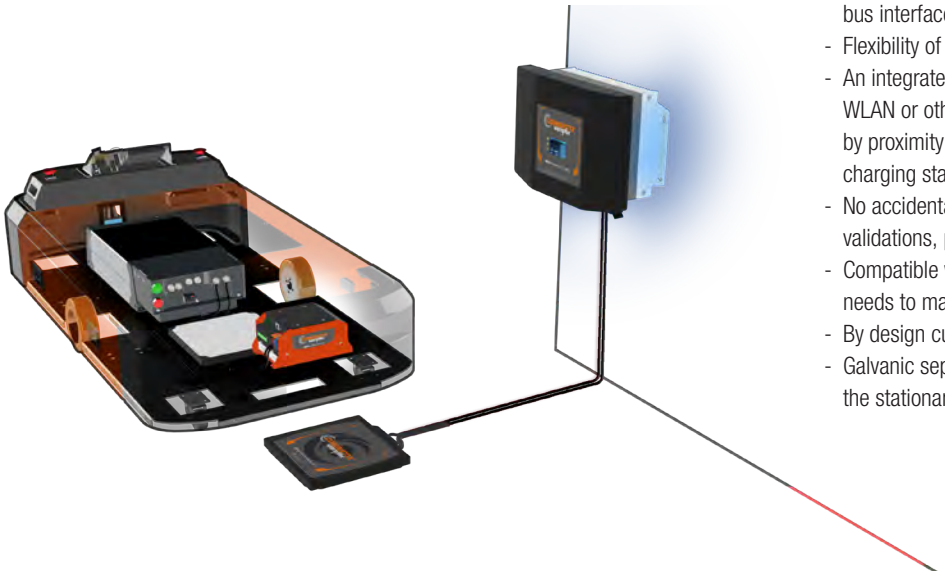
A simple example of wireless power transfer familiar to many of us, are electric toothbrushes. Not exactly designed for the same demands but build on the same basics.



The Charging System

Wireless Charging means

- Automated charging without manual interventions
- Applying the advantages of opportunity charging in regular operations, resulting in smaller batteries
- Resistance against harsh and dirty operation theatres
- The absence of mechanical wear and tear in the power transfer process, so significantly reduced needs for service and maintenance as there are no vulnerable contact surfaces or wearing plugs
- The absence of abrasives allows the use in sensitive areas, i.e. food production
- Increased in service time as the vehicles are charged in operation areas and don`t need to go to designated charging areas outside the process areas



WirelessCharger 3.0 is designed for

- Passive cooling, free of wear and tear
- Simple interfaces into the vehicle, resulting in simple integration
- Easy status recognition, even from distance, by the indicative halo light design
- Detailed status information on the displays or through bus interfaces
- Flexibility of horizontal or vertical mounting on vehicles
- An integrated inductive communication, not affected by WLAN or other radio based communication, is assuring by proximity communication the pairing of vehicle and charging station
- No accidental switch on by safety precautions, such as validations, pairing, defined charging orientation.
- Compatible with typical battery systems, only voltage needs to match
- By design current limited
- Galvanic separation of the onboard components from the stationary components

WirelessCharger 3.0
Charging

The Batteries

Conductix-Wampfler batteries are built up from long term proven battery cells. Power type cells and energy type cells, both using NMC technology, are available for various applications. Batteries are offered together with other Conductix-Wampfler products as a well aligned bundle. The overall design of **Conductix-Wampfler batteries** takes a big step forward to achieve robust and versatile battery systems for challenging industry use cases.

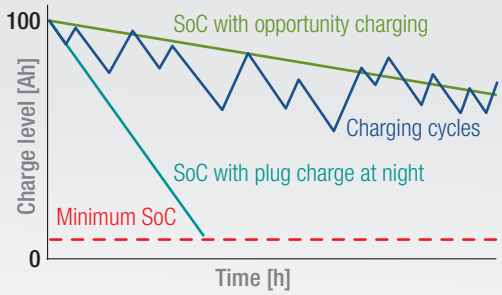
Conductix-Wampfler batteries are particularly characterized by:

- Robust and compact packaging, targeting to industrial use needs and operating conditions.
- Battery condition is constantly monitored by a battery management system, making the batteries very suitable for opportunity charging.
- Featuring well defined and simple interfaces to other bundle components, like various charging solutions, as well as to surrounding customer components.
- Configurable cell pack design allows the flexibility to size optimized battery packages, including special variants for heavy duty applications.

Opportunity Charging

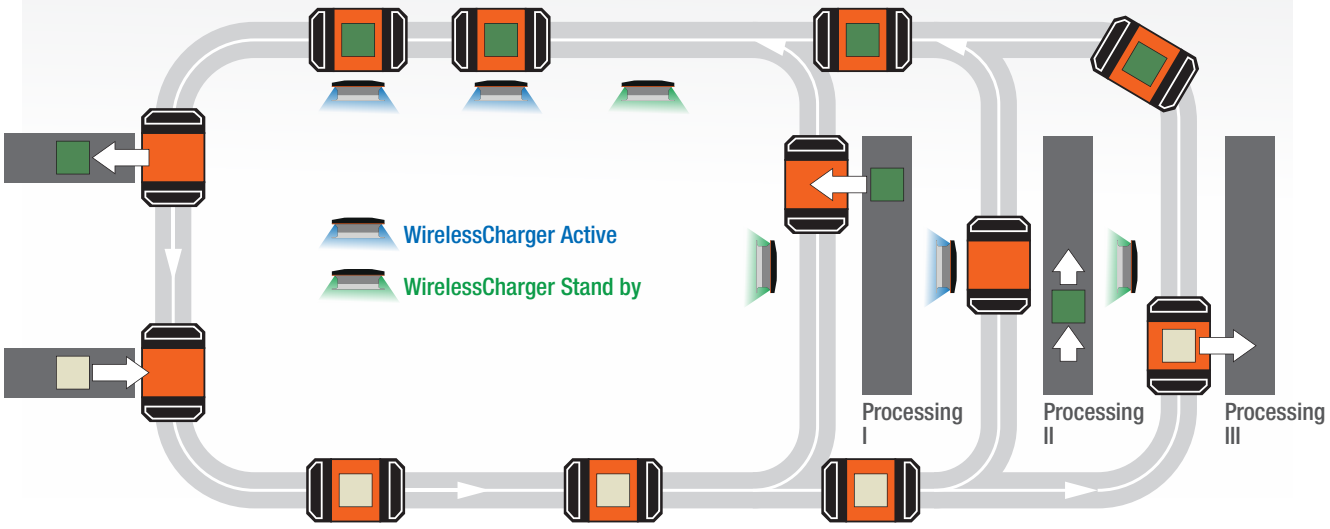
Opportunity Charging means the use of available time slots during operations. Typically, these are short but frequent stops. Which means you never recharge the battery completely; you just refill it to a certain extend.

But as this happens frequently, it helps to run vehicles with less onboard capacity. A “side effect” is the reduction of thermal stress on batteries. Being charged in short intervals and outside of situations most stressful for batteries (low and high states of charge) the thermal load is significantly reduced, which results in very healthy operation of batteries.



So resulting in

- **Lower investment in batteries**
- **Smaller battery volume, easier integration**
- **Improved life cycle of batteries**
- **Easier handling of batteries**



WirelessCharger 3.0
Components

Functional Components

The **IPS** (Inductive Power Supply), converts the 50 or 60 Hz mains frequency into a high frequency allowing highly efficient power transfer. Charging requirements and other information coming from the Battery management system onboard the vehicle is taken up by the ISP and transferred in corresponding action.

If you want to say so, the **IPS** is the heart and the brain of the **WirelessCharger 3.0**. Mains required is 230 V (200 – 270 V) 2-phase, fused at 16 Amps.

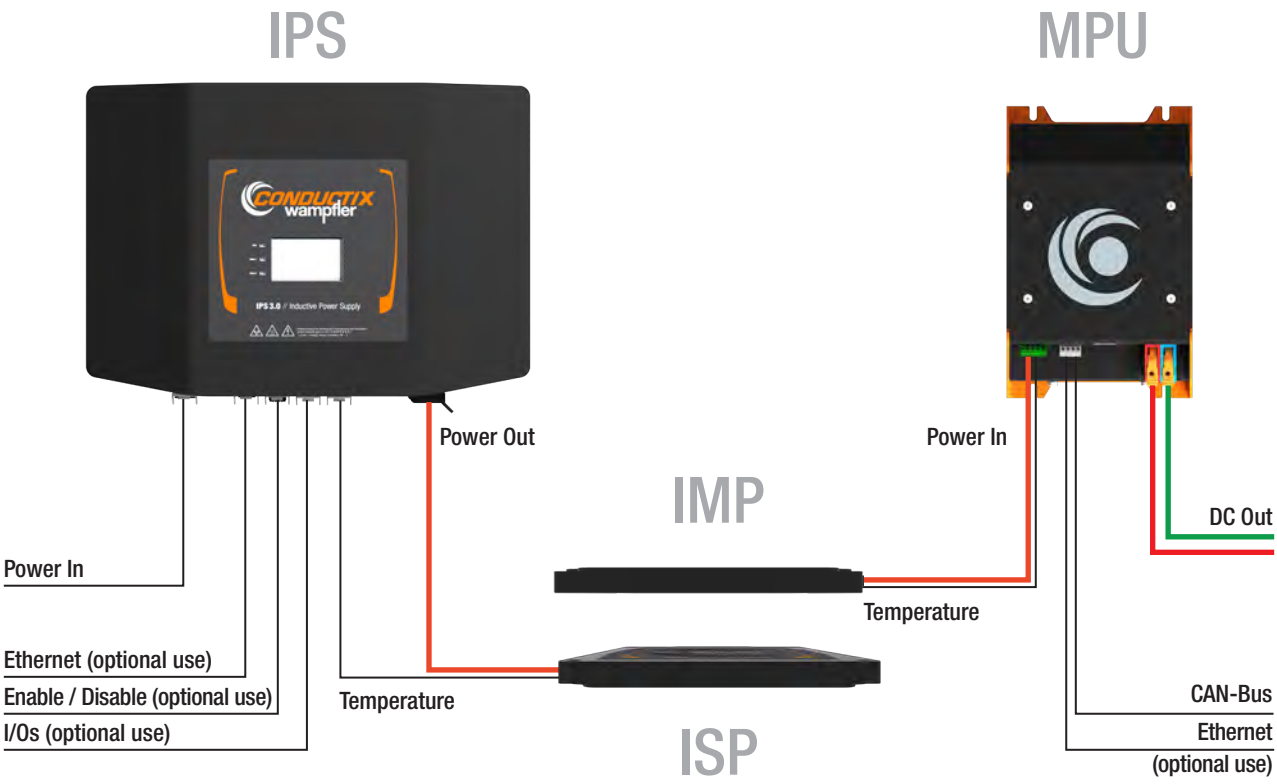
The **ISP** (Inductive Stationary Pad), includes the sending coil for the power transfer and inductive communication. Horizontal and vertical arrangements are possible. The **ISP** comes with a cable connection that can be easily cut to length.

The **IMP** (Inductive Mobile Pad), is the matching counterpart to the ISP. Design and build are widely identical to the ISP. The **IMP** comes with a cable connection that can be easily cut to length.

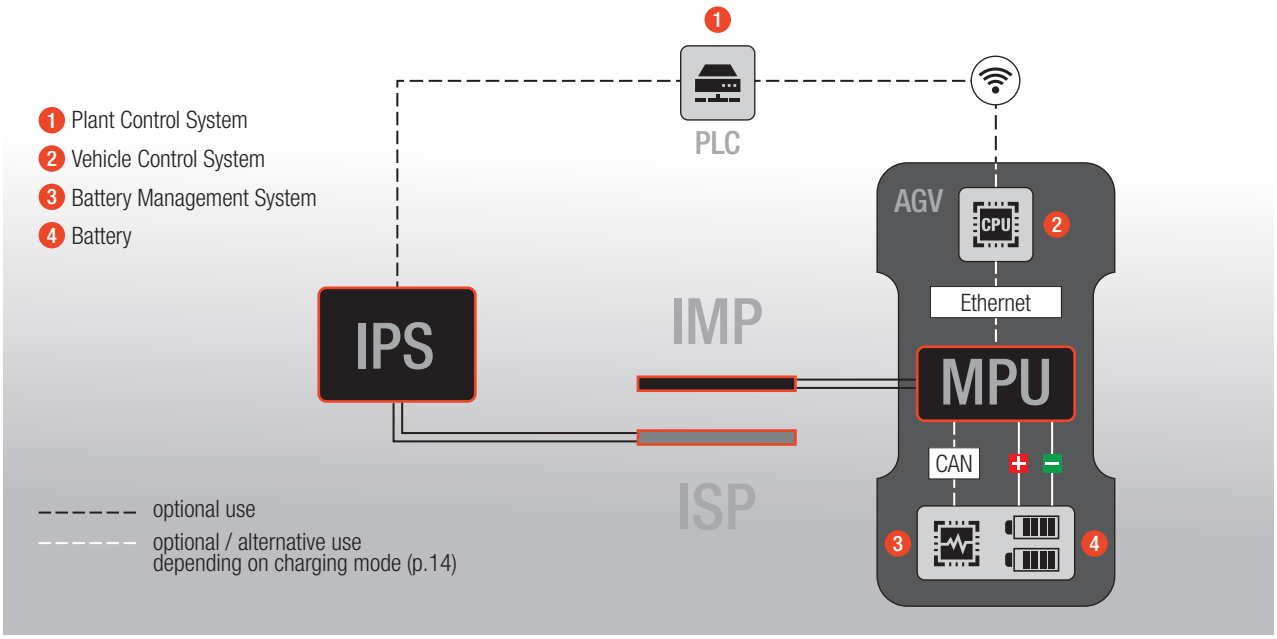
The **MPU** (Mobile Power Unit) is taking up the current induced in the **IMP** and provides a stable DC output towards the battery. The output voltage range is 21 to 59 V DC. The WirelessCharger can charge on demand when communication to the battery management system is active, or to set values when no communication is present.

WirelessCharger 3.0
Operating Principle

Functional Structure



Applicational Structure



WirelessCharger 3.0
Arrangements

Requirements

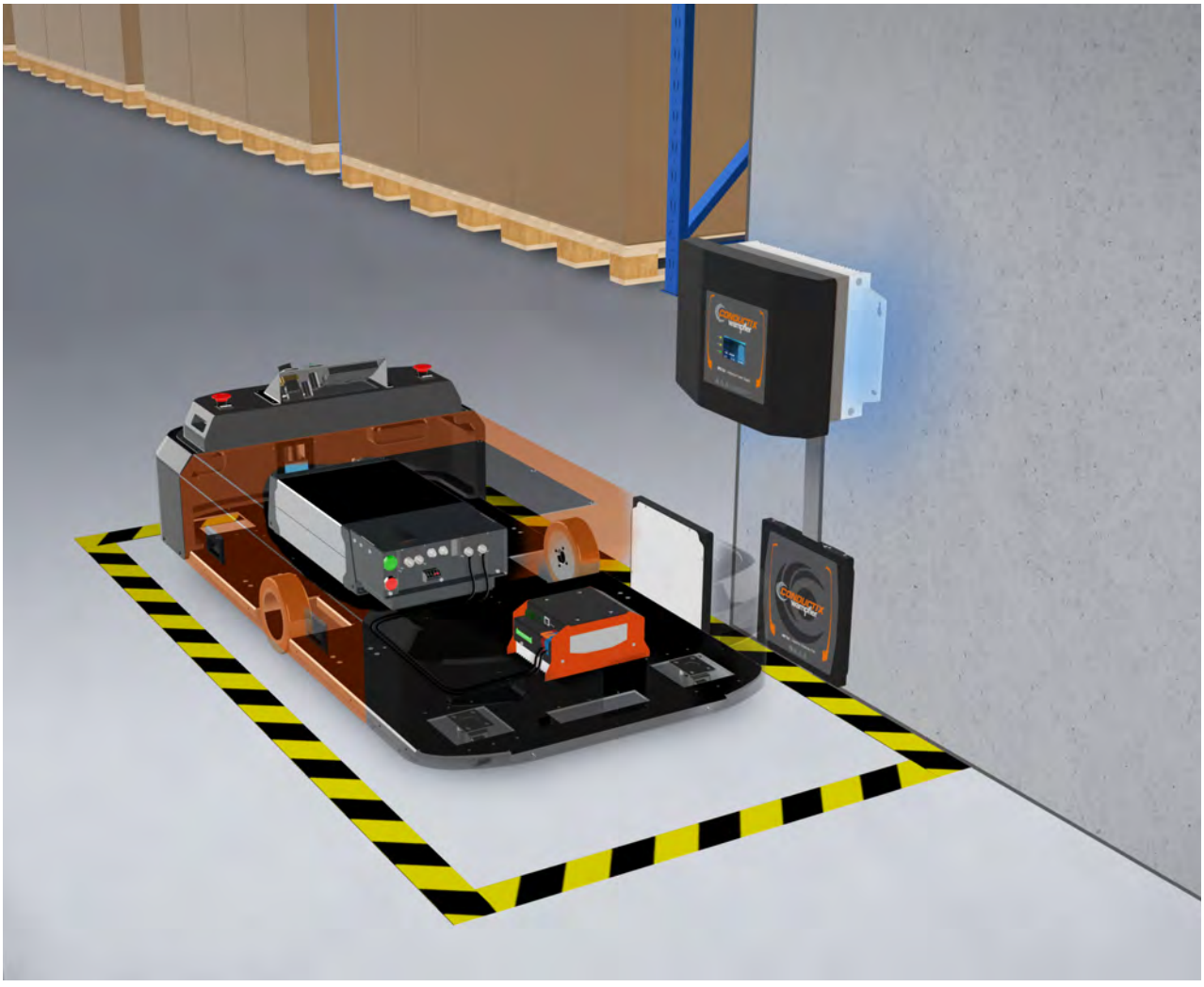
WirelessCharger 3.0 is providing implementation freedom. There is no preferred or required mounting orientation for the pads. Depending on vehicle design, available installation space and building structures in the operational environment the chargers can be installed horizontally or vertically.

Vertical Arrangement

The vertical arrangement doesn`t require the mounting on a specific side of the vehicle. Practice is in most cases to mount the **IMP** (Inductive Mobile Pad) on the left or the right side of the vehicle, so that a drive through situation is given. However also a front side mounting is possible if the local situation is making it necessary or recommendable. Naturally, it is mandatory to keep consistently one arrangement in an installation. A mix is possible, means however designated charging stations for designated vehicles.

The vertical arrangement requires building structures or extra stands of matching height to hold the **ISP** in correct position to the **IMP**, when in charging position.

The **ISP** (Inductive Power Supply) is foreseen for wall mounting typically. However, it can also be mounted on any building structures or stands. The **MPU** (Mobile Power Unit) can be placed flexibly on the vehicle.



WirelessCharger 3.0
Arrangements

Horizontal Arrangement

The horizontal arrangement is simply fixing the **ISP** (Inductive Stationary Pad) with 4 screws (at least 2) on the floor. A flat even floor underneath is recommendable to provide mechanical stability to the **ISP**, hollow spaces underneath should be filled with spacers if floor is not flat.

A second version of floor based installation is the floor embedded installation. Works on the floor itself are necessary to make cut-outs for the **ISP** and the feeding cable. The full integration installation`s benefit is the undisturbed floor level, allowing for cross traffic and avoiding stumbling edges.

Connection cables between **IPS** and **ISP** can be run on floor in cable bridges or in floor. When run in floor in slots it has been proven good practice to provide extra protection by Epoxy potting or to cover the slots. Which cable routing is preferable, depends at the end on chosen pad arrangement, local situation and ways of operation.

Principally drive-through use and forward/backward cross charging are both possible. With either use, it must be assured that cable routing does not create impacts on operation or safety hazards.

- Standards **ISP** and **IMP** are based on a square design. Other designs, i.e. rectangular, can be provided on request.

- For both, the IPS and as well the **MPU** do require a free air flow to provide cooling. If not possible on a guaranteed basis forced air cooling might be worth a consideration.

WirelessCharger 3.0
Set Stationary Side

IPS **3.0** | Inductive Power Supply

Plug connectors included
X1 Plug Set for Grid Power
X4 Enable Plug (for use when no remote Enable signal is available)
X6 and **X7** plugs do come with Stationary Pad ISP 3.0.

Plug connectors for separate purchase
X5 Plugs for IO`s
X4 for external wiring Enable
X3 for Ethernet

Nominal Power System	3.000 W
Supply Voltage	220-277 V AC +/-10% 50/60 Hz *
Input Current Rating	16 A
Output Current Rating	max. 25 Arms
Operating Frequency	85 – 130 kHz
Interfaces in use with WirelessCharger 3.0	Power/Ethernet/Digital I/O
Color	RAL7016/RAL2009/Metal Surfaces
Environmental Conditions	for industrial applications, indoor, dry and clean, no special requirements
Operating Temperature	0 ... +45°C
Cooling	Convection – Passive
Mounting Orientation	vertical
Protection Class	IP54
Weight	9,7 kg

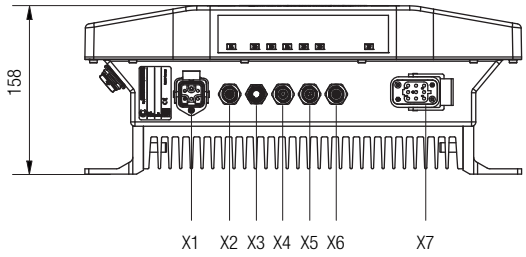
* 110 V : Phase – Phase (i.e. USA)
230 V : Phase – Neutral

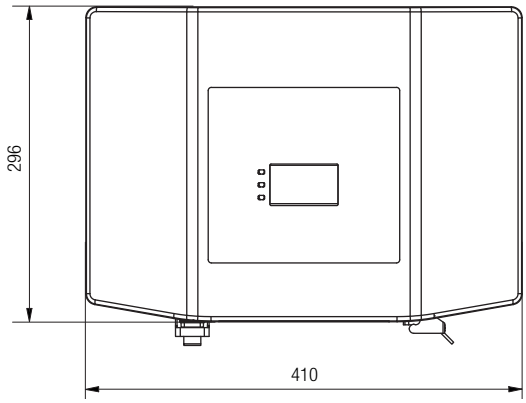
ISP **3.0** | Indictive Stationary Pad

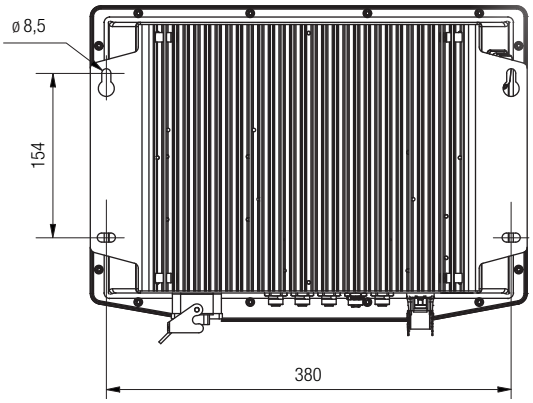
Plug connectors included
for X7 at IPS Plug Set for Power
for X6 at IPS Plug Set for Communication and Temperature Signal

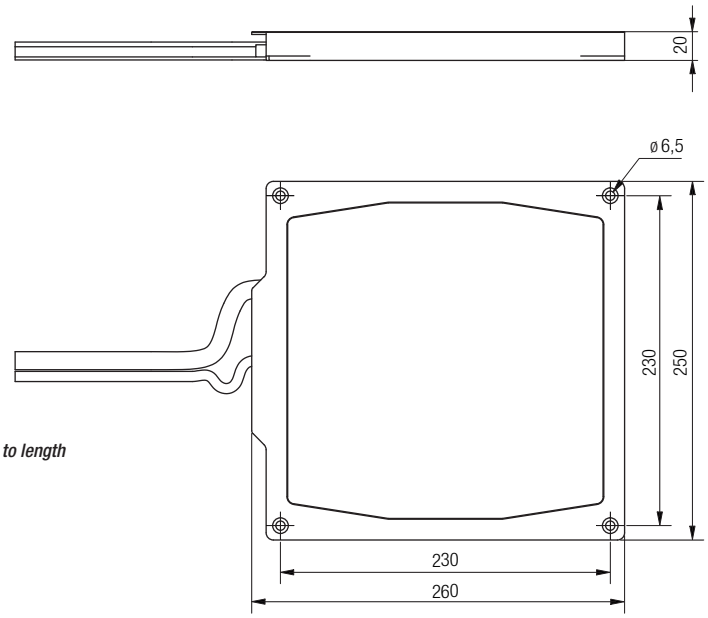
Nominal Power System	3.000 W
Feed	exclusively with IPS 3.0, 3kW
Cable Lengths	10.000 mm (plugs included)
Cable Termination and Cut to Length	On Site
Operating Frequency	85 – 130 kHz
Interfaces	Power Cable + Temperature Signal
Accessories (optional)	Frame Floor Mounting
	Frame Vertical Mounting
Color	RAL7016/RAL2009
Environmental Conditions	for industrial applications, indoor, dry and clean, no special requirements
Operating Temperature	0 ... +45°C
Cooling	Convection – Passive
Mounting Orientation	horizontal or vertical
Protection Class	IP65
Weight (incl. 10 m cable*)	7 kg
Plugs	included

Set Order-No.
CWA-60690001









WirelessCharger 3.0
Set Vehicle Side

IMP 3.0 | Inductive Mobile Pad

Plug connectors included
for X1 at MPU Plug Set for Power
for X2 at MPU Plug Set for Communication and Temperature Signal

Nominal Power System	3.000 W
Supply	Exclusively with Components WirelessCharger 3.0, 3 kW
Cable Lengths	1.000 mm (plugs included)
Cable Termination	On Site
Interfaces	Power Cable + Temperature Signal
Switches	None
Color	RAL7016/RAL2009
Environmental Conditions	for industrial applications, indoor, dry and clean, no special requirements
Operating Temperature	0 ... +45°C
Cooling	Convection – Passive
Mounting Orientation	Horizontal or Vertical
Protection Class	IP65
Weight	4.1 kg
Plugs	included

MPU 3.0 | Mobile Power Unit

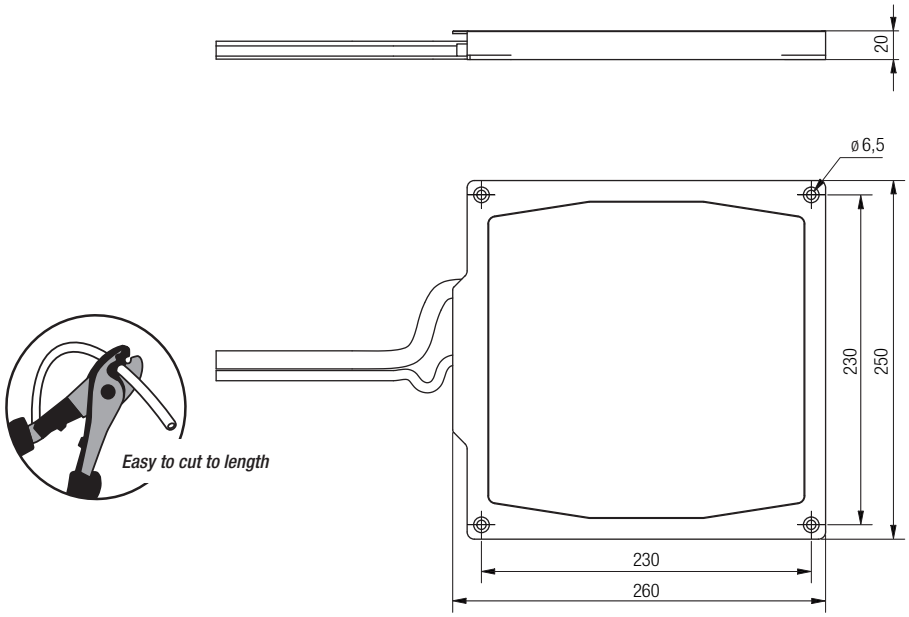
Plug connectors included
X1 Plugs for IMP Power in
X2 Plugs for IMP Signal in
X3 Plugs for the connection of CAN / CANopen
X Batt+ and X Batt- clamp contacts

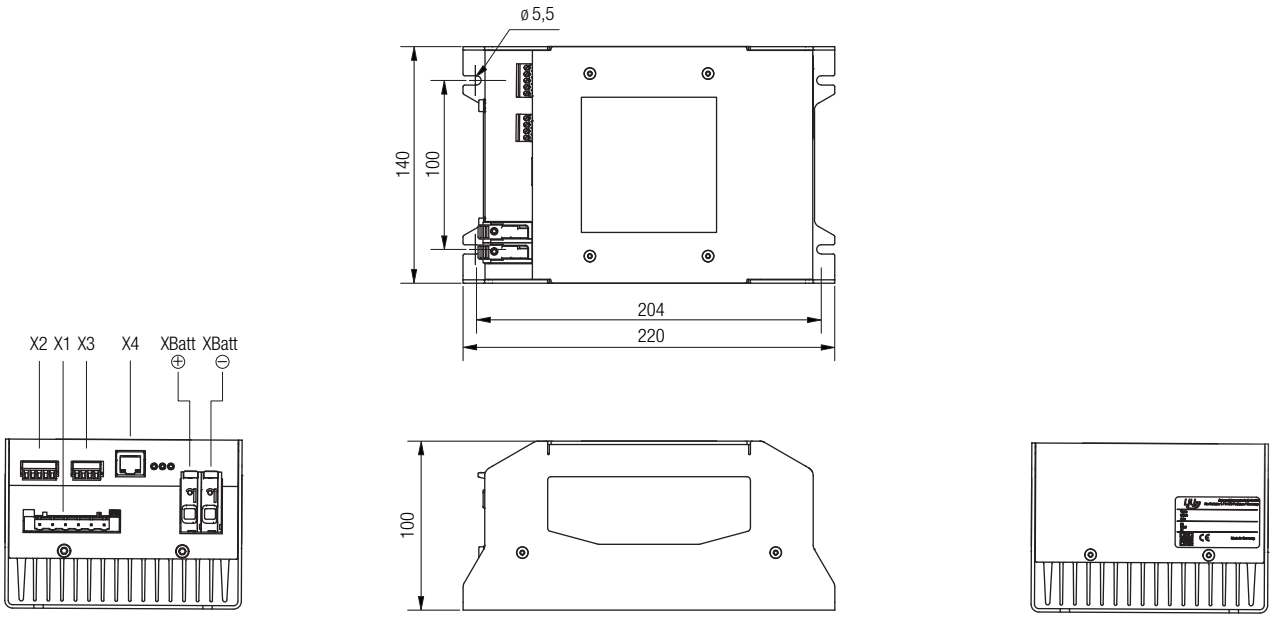
Plug connectors for separate purchase
X4 for Ethernet

Nominal Power Output	3.000 W
Supply	Exclusively with Components WirelessCharger 3.0, 3 kW
Output Voltage	21 .. 59 V DC
Output Current	60A at 50V (derating to 51A at 59V)
Output Connection Terminals (Power)	16 mm^2 terminals +/-
Interfaces	Power | Ethernet | CAN* | Digital I/O
Switches	None
Color	RAL7016/RAL2009/Metal Surfaces
Environmental Conditions	for industrial applications, indoor, dry and clean, no special requirements
Operating Temperature	0 ... +45°C
Cooling	Convection – Passive
Mounting Orientation	vertical (recommended)
Protection Class	IP20
Weight	2.8 kg

* exact specification CAN/CANopen on request available

Set Order-No.
CWA-60690000



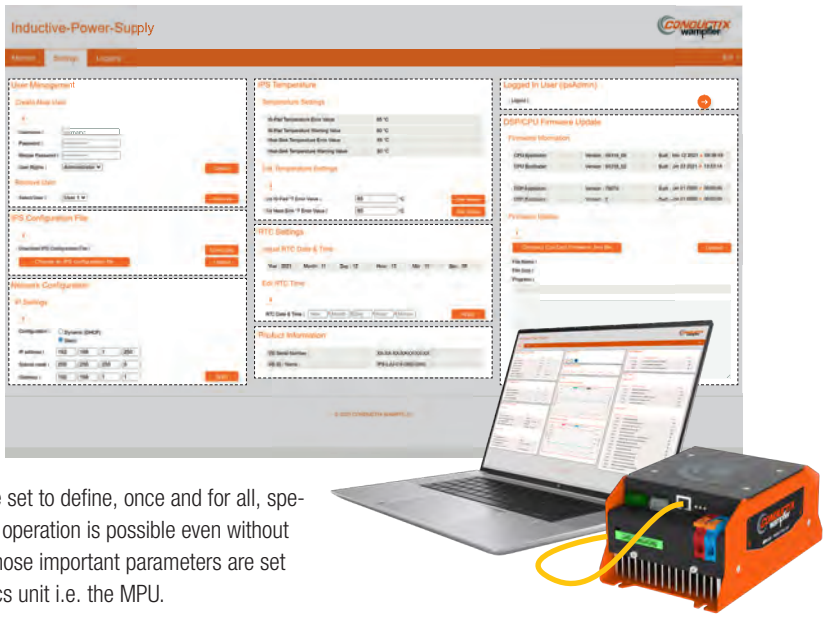


Version without heatsink available on request.

WirelessCharger 3.0

WebServer User Interfaces and versatile onboard communication

Mode Selection and Parameter Settings via Webserver



The **MPU** has two communication ports, **CAN2.0B / CANopen** and **Ethernet**, to interact with the Battery Management System (BMS) and/or with the Vehicle Control Unit (VCU or PLC) if required for the overall system setup.

WirelessCharger 3.0 offers the great benefit of four possible modes of operation, which will cover most of the software design requirements, including the “Manual Mode” which is very useful for testing and commissioning, if not used for normal operations. Selecting one mode or the other will define how the charging process is managed and especially through which interface. Generally, the BMS and the VCU leads the charging process and **WirelessCharger 3.0** follows the current and voltage requests provided. Manual parameters can also be set to define, once and for all, specific current and voltage requests to follow. This specific mode operation is possible even without communication links to the battery or vehicle control unit. All those important parameters are set thanks to an embedded Webserver hosted inside the electronics unit i.e. the MPU.

The Ethernet port allows both a Vehicle Control Unit, VCU, (TCP/UDP) communication and an access to the Webserver running on the **MPU**, thanks to a generic browser from a laptop computer.

The Webserver is a user-friendly interface used to select the Mode of operation, to set manual parameters, to acknowledge warnings and errors, to monitor status information and to access logged data.

Uploading and Downloading options makes it possible to transfer easily configuration files between AGVs, as well as to proceed to optional firmware updates. The access to the Webserver is secured by logins and passwords. The four possible modes of operation are the following ones:

Manual Mode

- U&I parameters: Set manually by an operator, by browsing the **MPU** Webserver with a laptop computer.
- Start of charge: Automatic, when the stationary and mobile pads face each other.
- Stop of charge: Automatic, when the pads move away from each other or when reaching a charging threshold (voltage limit, end of charge).

BMS-Only Mode

- U&I parameters: Set by the BMS via the CAN port.
- Start of charge: Automatic, when the stationary and mobile pads face each other but only if the BMS has a valid « Enable » byte in its CAN instructions.
- Stop of charge: Same conditions as Manual mode, or when the BMS « Disable » byte is activated, or in case of absence/loss of CAN communication (cyclic messages required).

PLC-Only Mode

- U&I parameters: Set by the PLC/VCU via the Ethernet port.
- Start of charge: When the PLC/VCU sends a « Start » order in its Ethernet instructions and if the stationary and mobile pads face each other.
- Stop of charge: Same conditions as Manual mode, or PLC/VCU « Stop » order or absence or loss of Ethernet communication (cyclic messages required).

BMS and PLC Mode

- U&I parameters: Set by the BMS via the CAN port, with a possible offset by the PLC/VCU via Ethernet.
- Start of charge: When the PLC/VCU sends a « Start » order in its Ethernet message and if the stationary and mobile pads face each other but only if the BMS has a valid « Enable » byte in its CAN message.
- Stop of charge: Same conditions as all other modes of operation altogether.

In all cases:

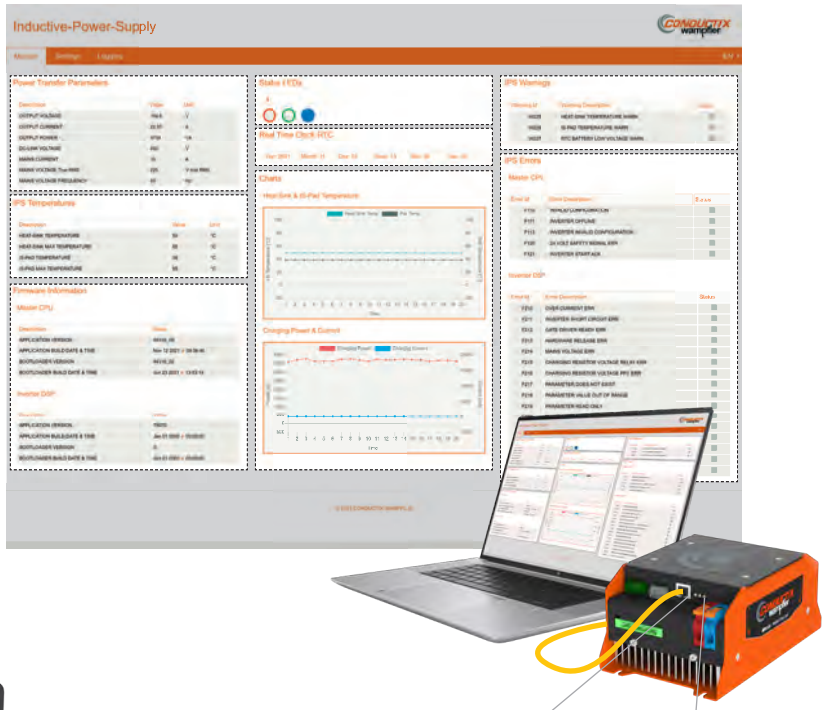
- a warning threshold reduces the charging power, based on temperature of pads and heatsinks
- an error threshold stops the charging process, based on temperature of pads and heatsinks
- a stop of the charging process can also be triggered from the stationary side of **WirelessCharger 3.0**

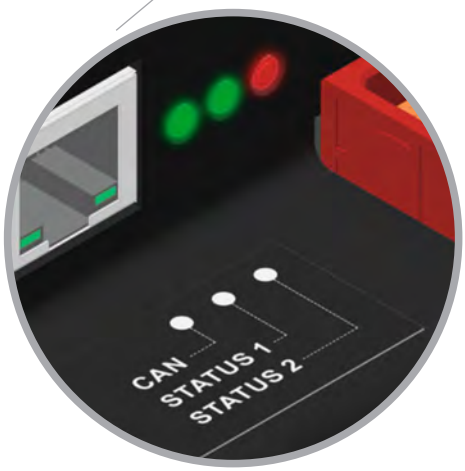
Status Monitoring – easy first view status recognition and in-depth information

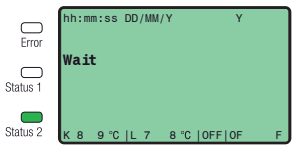
The system user interfaces allow to recognise the system state easily.

Status information is provided on the **IPS** side by screen display information, by screen colour, by LEDs and by bright backlight colour on the rear mounting wall. On the vehicle side (**MPU**), the status of operations and CAN communication are clearly indicated by LED`s.

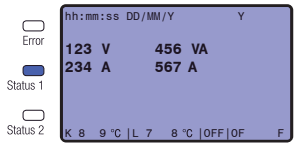
Current status information as per unit can also be retrieved through the Ethernet interfaces of the **IPS** and the **MPU**. A computer can be directly connected to any of the units by cable, or a network connection can be considered, especially for all the **IPS**s, for local and/or remote monitoring. All units can be addressed by their settable IP-addresses, individually. Status information can also be displayed via the Webservers, locally on a laptop computer.



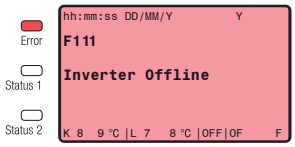




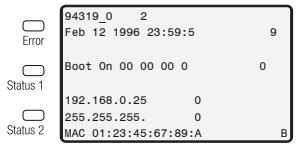
Standby



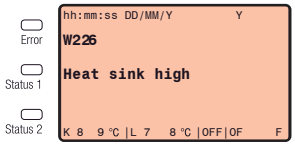
Charging



Fault



Service



Warning

WirelessCharger 3.0
FAQs

How does the charging process work?

Whenever the « Start of charge » conditions are met, **WirelessCharger 3.0** starts delivering the current target as set within the chosen Mode of operation. The **MPU** output current ramps up very quickly and runs through the battery, which sets the charging voltage (a low State of Charge leads to a smaller internal resistance and to a smaller voltage). The charging voltage is a constant feedback for the charging process which will let the current reach its target as long as the set voltage threshold is not reached.

- **Constant Current phase (CC):** When the battery is discharged, the **MPU** delivers the target current and the charging voltage is set by the battery internal resistance. When the battery is being charged, its internal resistance increases, hence increasing gradually the measured charging voltage.

- **Voltage Threshold:** It is the pivot point from which it is important to reduce the charging current, so as to limit the charging voltage and in order not to go beyond the battery datasheet voltage limit. The voltage threshold in many cases is approximately the voltage reached at 80% SoC.

- **Constant Voltage phase (CV):** When the battery is charged at more than 80%, the charging voltage is about to go beyond the voltage threshold, then **WirelessCharger 3.0** behaves like a voltage regulator and reduces the **MPU** current output, just as needed, to keep the charging voltage below the voltage threshold. As the charging process keeps on going, the battery internal resistance keeps up rising, therefore **WirelessCharger 3.0** keeps on reducing the charging current, until a Stop condition is met. Charging during CV phase is slower.

Which settings should I use?

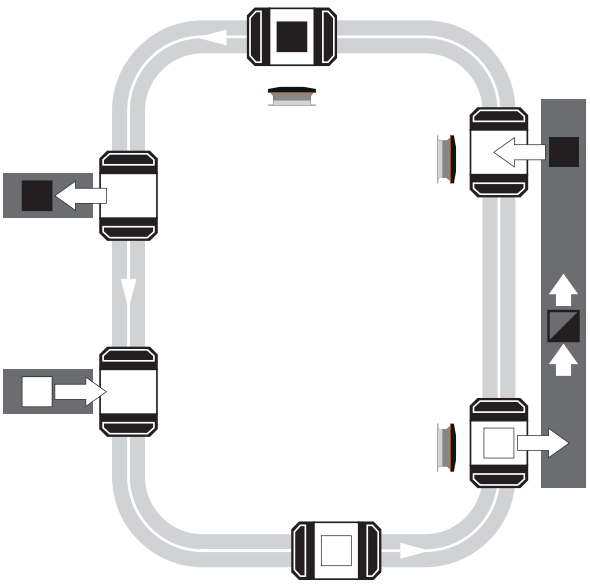
The safest recommended settings are those exchanged directly between a Battery Management System (BMS) and the **MPU** in the frame of a BMS-only mode of operation: the battery permanently tells the charger what it needs, via a CAN communication. Other settings are possible, by using other modes of operation. It is important to refer to the battery manufacturer datasheet and to follow the recommended values for the charging current and the charging voltage: this will preserve the battery life cycle number and will avoid any hazardous situation:

- Charging current setting must always be below the maximum charging current value stated in the battery datasheet.

- Voltage threshold setting should always be below the maximum voltage value stated in the battery datasheet.

- Overvoltage setting should preferably be below the maximum voltage value stated in the battery datasheet, as well, at a value strictly above the Voltage threshold setting.

How many charging stations do I need?



WirelessCharger 3.0 is based on charging stations compatible with all **MPU**s, whatever the types of batteries, the types of vehicles, or the selected mode of operation. The same charging station can charge a Li-ion battery right after it has charged a lead acid battery on a different type of vehicle in the same plant.

Only the total number of vehicles and their need for recharge should be considered for an evaluation of the needed number of charging stations.

There are applications requiring one charging station for each vehicle. Other applications can cope with one charging station for four vehicles. On average, there are two to three vehicles for each charging stations.

WirelessCharger 3.0
FAQs

What kind of communication can be established with the BMS?

The Battery Management System (BMS) is a specific piece of hardware in all Li-ion batteries. It does not exist in Lead Acid batteries. It aims at, among other things, balancing and protecting the battery cells and, in most cases, at communicating with the charger so as to get the proper charging current at all SoC levels, avoiding any battery hazard and maximizing the battery life cycle number.The communication of a BMS and a charger is defined by a protocol which goes up to the definition of specific bytes in a set order (e.g. : current, then voltage, then SoC, then temperature, etc)

A battery with a CAN 2.0B port might or might not be compatible with WirelessCharger3.0 CAN 2.0B port: it all depends on the data definition (the data matrix) which should match the ones embedded in the charger. If needed, the BMS data matrix could be updated (please refer to battery supplier) to match one of the protocol options provided for with **WirelessCharger 3.0**. Alternatively, the BMS can speak to the PLC/VCU via CAN 2.0B so that the PLC/VCU instructs the **MPU** via Ethernet in PLC-only Mode.

The many options of protocols and the many modes of operations available with **WirelessCharger 3.0** grants you the maximum range of options for a suitable charging solution of your own. Should your needs vary from the ones implemented, please do consult us for additional options.

What are the typical charging sequences defined by AGV/AMR integrators?

Full charging: The charging process is performed with little time constraints. It goes through the entire CC and CV charging phases, in order to reach close to 100% SoC at the end of the charging process.

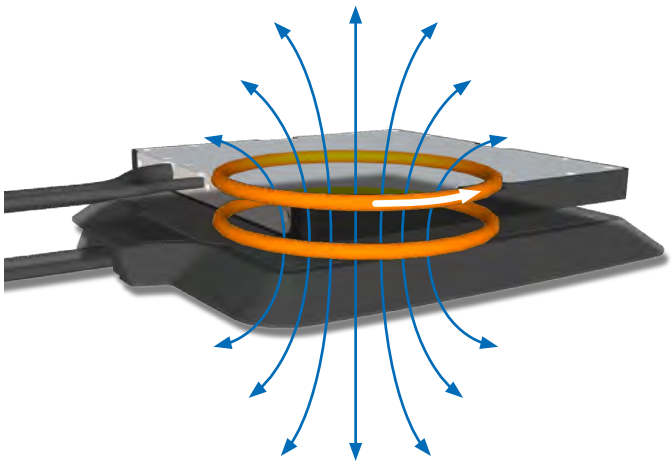
Opportunity charging or « In-Process » charging: Additional charging stations are available to perform charging during a rather short period of time, at quite a high current, when a vehicle is idling in between two tasks to perform. The benefits are real with a fast starting charger like **WirelessCharger 3.0**, and it is usually preferred for batteries which are not charged to more than 80% SoC.

Intermediate charging: The charging process is set to keep the battery partially charged, as only a fraction of the battery capacity is intended to be used (small Depth of Discharge, or DoD). Charging a battery at less than 80% SoC could significantly improve its life cycle number, but will require more frequent charging sequences, all in CC phase with a shorter charging time (compared to the longer charging of the CV phase).

The final choice of the charging sequence(s) depends on many factors related to the application needs and the hardware involved. It is specific to each application type and each vehicle design, but it is mostly a system software management topic.

What are the field and health effects?

There is no magnetic field around a stationary pad as along as it is not facing a mobile pad: this is impossible. Indeed, a condition for **WirelessCharger 3.0** to start its operation is the establishment of a communication between the mobile electronics (**MPU**) and the charging station (**IPS**), which can be performed only if there is a close proximity of two pads with a proper alignment. This is a specific safety design of **WirelessCharger 3.0**, which is independent from any radio system and therefore not subject to any radio interference while in operation.



There is a magnetic field around the pads when power is being transferred. As our designers are well aware of this, they worked out a field strength which does not exceed the legal limits and recommendations as given i.e. by the ICNIRP (International Commission for Non-Ionizing Radiation) in 2010.

The ICNIRP recommendation is worldwide recognized and the basis for most national legislation and standards. The fields are not to be compared with radio waves as occurring in radio communication or with mobile phones: these are electro-magnetic waves designed to be sent out to bridge large distances. It must also be noticed that magnetic fields, as used in **WirelessCharger 3.0** as means for power transfer, are linked to their source, so they are always limited to the very proximity of the pads.

WirelessCharger 3.0
FAQs

What types of batteries or accumulator can I use?

Most types of batteries can be used with **WirelessCharger 3.0** (Lead Acid, Li-ion NMC, Li-ion LFP, etc). Batteries with or without communication port can be used as well. Accumulators can of course be used, as this should be the suitable name to use as we speak of rechargeable energy storage solutions, but generally speaking the word « battery » is being used in the industry. So let's keep speaking of « batteries » instead of "accumulators".

A few battery manufacturers restrict the charging possibilities by imposing a communication byte to be activated (via CAN), hence reducing the modes of operation options to BMS-only Mode or BMS&PLC Mode.

Do you offer batteries at Conductix-Wampfler?

Yes we do ! **BatteryBlock** is our main line of products for AGVs and AMRs. It offers a high C-rate, long life, compact energy storage solution. It is also instantly compatible (plug-and-play style) with one of our communication options, on the **MPU** side of **WirelessCharger 3.0**.

Our batteries are designed and fully type tested in Germany, where we have our main assembly line.

Eventually, is WirelessCharger 3.0 the best solution?

WirelessCharger 3.0 is the best solution of its class, in terms of flexibility, durability, efficiency etc.. It is particularly needed in oily, moisty, or dusty environments and for applications where non qualified workers are in touch with automated vehicles. It brings an all-in-one solution that saves a lot of time in the electrical design of automated vehicles while providing a safer appearance to those vehicles. It safes costs by reducing manual charging or reducing the investment in additional vehicles or batteries.

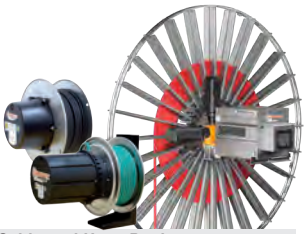
Conductix-Wampfler also offers conductive charging solutions: **Enduro+** and **Nano+** are our latest state-of-the-art extra-long life modular charging contacts, with more than 1.000.000 tested cycles of operations, while **KontaktCharger** is our latest series of conductive chargers. Conductive charging is generally cheaper first view and it requires much less space on the vehicle side, but it needs a specific design for each rating and specific hardware might be needed for each battery or vehicle type, hence requiring different charging stations.

So all in all, conductive charging requires more engineering and precautions on OEM side, while allowing a more accurate choice of components, with no limit in rating choices, much less space requirements and a high mechanical flexibility.

Dynamic charging is also available with both inductive and conductive technologies, at Conductix-Wampfler.
We can advise you with a neutral consultancy approach to find the best fit for your application.

Your Applications – our Solutions

The solutions we deliver for your applications are based on your specific requirements. In many cases, a combination of several different Conductix-Wampfler systems can prove advantageous. You can count on Conductix-Wampfler for hands-on engineering support together with the optimum solution to safely meet your needs.

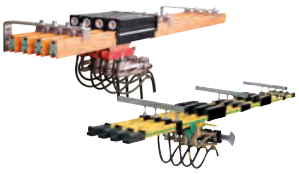


Cable and Hose Reels

Motor driven and spring driven reels by Conductix-Wampfler provide energy, data and media over a variety of distances, in all directions, fast and safe.

Festoon Systems

Conductix-Wampfler cable trolleys can be used in virtually every industrial application. They are reliable, robust and available in an enormous variety of dimensions and designs.



Conductor Rails

Available as enclosed or multiple unipole systems, Conductix-Wampfler conductor rails reliably move people and material.

Inductive Power Transfer

The no-contact system for transferring energy and data. For all tasks that depend on high speeds and absolute resistance to wear. Flexible installation when used with Automated Guided Vehicles.

Non-insulated Conductor Rails

Robust, non-insulated aluminum conductor rails with stainless steel cap provide the ideal basis for power supply of people movers and transit networks.

Radio Remote Controls

Safety remote control solutions customized to meet our customer needs with modern ergonomic design.

Reels, Retractors and Balancers

Available for hoses and cables, as classical reels or high-precision positioning aids for tools, we offer a complete range of reels and spring balancers.

Jib Booms

Complete with tool transporters, reels or an entire media supply system – safety and flexibility are key to the completion of difficult tasks.

Slip Ring Assemblies

Whenever things are really “moving in circles”, the proven slip ring assemblies by Conductix-Wampfler ensure the flawless transfer of energy and data. Here, everything revolves around flexibility and reliability!

Mobile Control Systems

Mobile control solutions for your plant – wether straightforward or intricate. Control and communication systems from LJU have been tried and tested in the automotive industry for decades.

ProfiDAT®

This data transfer system is a compact slotted waveguide and furthermore can be used as Grounding rail (PE) as well as positioning rail at the same time.

Charging Solutions

Whether inductive or conductive, this bundle of products offers always the perfect solution for all industrial charging tasks including the matching battery with integrated BMS.

www.conductix.com

Conductix-Wampfler
has just one critical mission:
To provide you with energy and data transmission systems that will keep your operations up and running 24/7/365.

To contact your nearest sales office, please refer to:
www.conductix.contact

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