

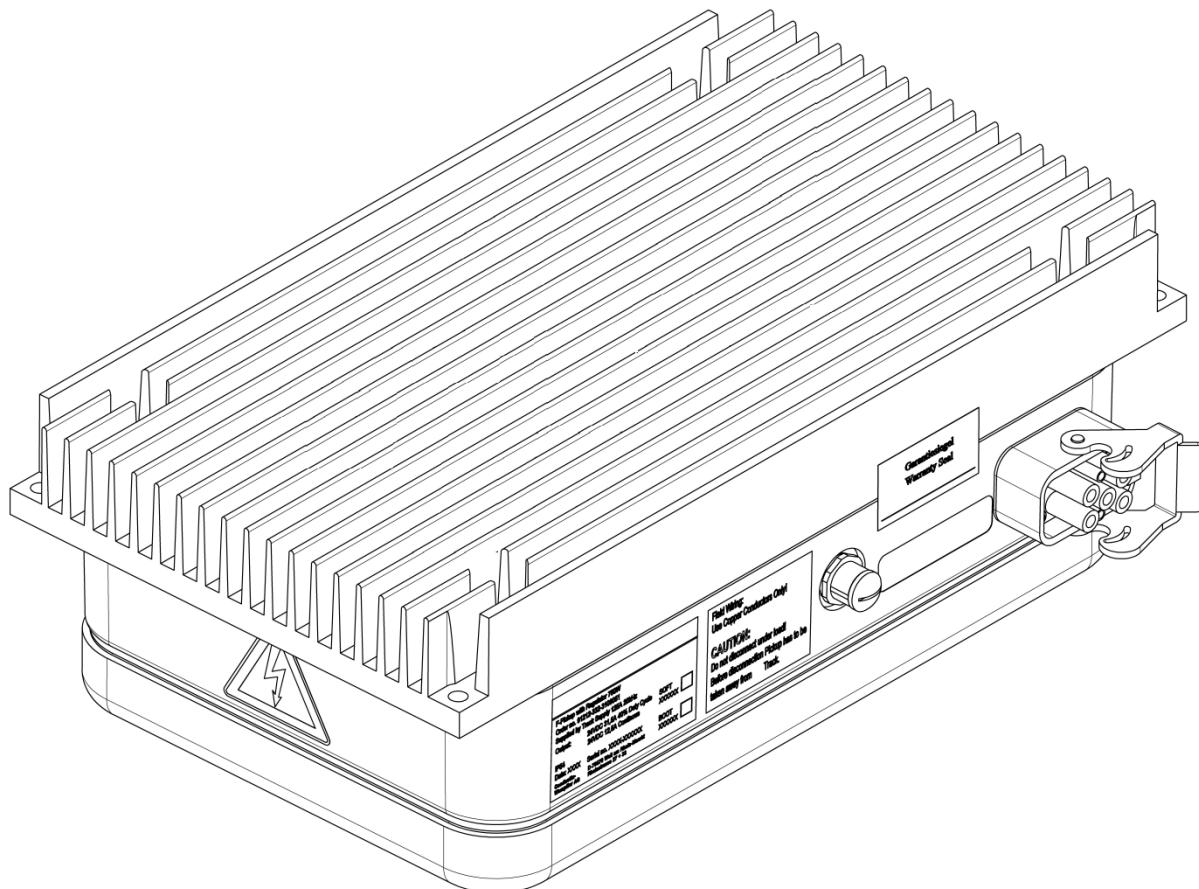
Operating Instruction

750 W 27 V F-Pickup CQF 04/2 + Interface M12



Order Number

91212-332-3124850



750 W 27 V F-Pickup CQF 04/2 + Interface M12

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Important:

Company names mentioned in this manual that are registered and protected trade names by copyright remain the property of the companies themselves.

In order to improve the energy supply system and its function, we reserve the right to carry out technical modifications of illustrations and statements in this operation manual.

Please find details related to a whole system in the system manuals. Always refer to the system documentation before starting any work on the system or components within the system or before operating the system.

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1 Symbols and Hints

Safety advice in these mounting and operating instructions is marked by symbols. Safety advice start with signal words, that inform about the degree of danger. Safety advice must be absolutely observed. Exercise caution in order to avoid accidents, injuries of persons and damage to property!



... refers to an imminent danger, which might cause deathly or serious injuries if not avoided.

DANGER!



... refers to a possibly dangerous situation, which might cause deathly or serious injuries if not avoided.

WARNING!



... refers to a possibly dangerous situation, which if not avoided, may result in moderate or minor injury and property damage.

CAUTION!



Advice and recommendations:

... gives advice and recommendations as well as information for an efficient and undisturbed operation.

ADVICE!

To achieve fault-free operation and any rights to claim guarantee it is necessary to observe and fulfill the information given in this manual or related documents at any time.

Read the manual entirely before starting any work and operation of the device.

This manual contains operation related information. It is therefore recommendable to keep it in the vicinity of the device.

2 Advisory Information for the User



DANGER!

Electric shocks and/or burns as well as material damages due to improper handling/operation or faulty installation!

This device contains life threatening voltages!

- Do not open the device.
- Do not insert any objects inside.



WARNING!

Risk of injury in case of insufficient qualification!

Incorrect handling can cause serious injuries to persons and heavy damage to property.

- All electric installation and commissioning work as well as repair work and disassembly have to be carried out by qualified staff (IEC 364 respectively CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and national safety rules).

Qualified staff, according to the safety regulations, are persons that are familiar with the installation, assembly, commissioning and operation of the energy supply system and that have the appropriate qualifications.

This manual contains exclusively details of the specified pickup. Observe all instructions and technical data given in this manual. Ensure that the device is operated under the specified conditions only.



Do not start up the device or related devices within the system until you have made sure that the machine/system it is integrated into complies with the applicable norms, standards and directives and that conformity is stated.

Conductix-Wampfler cannot be responsible for damage and breakdown that have been caused by not observing this manual.

We reserve the right to carry out technical modifications of illustrations and statements in this instruction manual. References to other documents specifying the document number do not include the revision index. Refer to the project handbook when available for a list of relevant documents.

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3 Intended Purpose

The intended purpose of this device is for use in conjunction with other components for the inductive transfer of electrical power. A Regulator produces DC voltage from the AC magnetic field generated by a track and captured by a Pickup. The device is not suitable for standalone operation and must be used in conjunction with the appropriate components. The device shall always be used with inductive power transfer components manufactured by Conductix-Wampfler:

Qualified personnel only may operate this equipment. Any repair work is only carried out by Conductix-Wampfler employees.

The device can be seen as a voltage source and can be used for trickle charging, when adequate precautions are taken. For more detailed information about trickle charging, see chapter 8.2.4 „Battery Charging“.



WARNING!

Danger caused by application not in accordance with regulations!

Each application of the equipment not in accordance with and/or different from the regulations can result in dangerous situations.

- Only use the equipment in accordance with the regulations.
- Any details of these mounting and operating instructions must be strictly observed.
- The following applications of the equipment are prohibited. Applications not in accordance with regulations are as follows:
 - Application of the equipment with accessories not permitted or authorized by the manufacturer
 - Operation of the equipment by not instructed personnel
 - Operation of the equipment outdoors
 - Operation of the device in potentially explosive atmospheres
 - Operation of the device outside the specifications
 - Operation of damaged equipment
 - Misuse of the device e.g. as climbing aid
 - Usage of the device without additional measures to charge batteries or other energy storages.
(The pickup is **no** charging device and therefore has no appropriate voltage sensors, protections and charging algorithms!) When using the device for trickle charging, additional measures must be taken on-site. See chapter 8.2.4 „Battery Charging“.

Any claims due to improper application are excluded. The operator is responsible for any damage due to improper application.

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4 Technical Data



The data specified in this section are valid only if the requirements regarding the environment of the device (nominal position, ambient temperature, etc.) are respected.

For instance, the layout of the track, the variations with respect to nominal position of a Pickup, or the ambient temperature around a Regulator, may lead to a reduction of the peak and/or continuous power available.

4.1 Electrical Data

■ Input Power	Track: 125 A 20 kHz, Cable distance 100 mm
■ Output voltage	27 V DC @ 25 °C in nominal position
■ Maximum output current	27.8 A DC*
■ Nominal peak output power	750 W 40% ED*
■ Continuous output power (Track: 125 A)	450 W @ 27 V DC - at 20 °C ambient - load averaged over 10 minute period - with min. 0.1 m/s air flow at nominal position
	300 W @ 27 V DC - at 40°C ambient - load averaged over 10 minute period - with min. 0.1 m/s air flow at nominal position
■ Heat loss	< 50 W at full load
■ Electrical protection	Class II (reinforced internal insulation)
■ Insulation to ground	Output to ground tested at 3.7 kV DC/10 sec. <i>EN 50178</i>
■ Max. current isolated 24 V supply (interface plug)	150 mA (not suitable for external consumers)
■ Standby consumption (without load)	approx.10 W (ON) or approx. 5 W (OFF)

*max. 4 minutes (see chapter 7.4 and 8.2.1)

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4.2 Environmental Data

■ Storage temperature	-25 °C to +55 °C <i>EN 60721 Class 7K3</i> <i>EN 60721 Class 7K3</i>
■ Transport temperature	-25 °C to +70 °C <i>EN 60068-2-1 Class 7K3</i> <i>EN 60068-2-2 Class 7K3</i>
■ Amb. temperature operation	+ 5 °C to +40 °C IEC 60068-2-1; IEC 60068-2-2 Air temperature as measured in immediate vicinity of working device. Please note that the heat loss of the device will raise the ambient temperature, especially in enclosed mounting spaces.
■ Operation	For indoor operation only The operation in potentially explosive atmospheres or in areas where the device is exposed to aggressive oils, gases, radiation or humidity is explicit prohibited!
■ Humidity	< 85%, none condensing <i>EN 60068-2-78</i>
■ Vibration	IEC 60068-2-64; IEC 60068-2-6; IEC 60068-2-27 <i>EN 60721-3-7 Class 7M1</i>
■ Chemical resistance	For industrial use without special conditions. Any specific influences of chemicals must be checked.
■ Protection rating	IP20 / IP54 (when plugs are in place)
■ EMC environment	The device is designed for use in industrial environments. <i>EN 55011 Class A</i> <i>EN 61000-6-2</i> <i>EN 61000-6-4</i>
■ Installation altitude	Up to 1000 m; continuous output power must be derated for higher altitudes.
■ Transport	<i>EN 60721-3-2 Class 2M2</i>
■ EMF	< 6,25 µT <i>EN 50413:2008</i>

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4.3 Safety Protection

The device is equipped with the following features which protect the pickup:

- Output over voltage Automatic shutdown if the voltage supplied by the pickup > 30 V DC.
Output protected up to 100 V (protection against polarity)
- Interlock DC output Automatic shutdown when plug is unplugged
- Over current Output is current limited by automatic shutdown (typical 34 A)
- Low voltage Automatic shutdown during low voltage,
e.g. due to overload or short circuit of output U < 12 V
- Energetic recovery protected against energetic recovery up to 30 V
- Over temperature Automatic shutdown by internal temperature monitoring,
e.g. by exceeding the allowed ambient temperature and/or the maximal allowed output power.
- Standy discharge 4.7 kΩ parallel to DC output

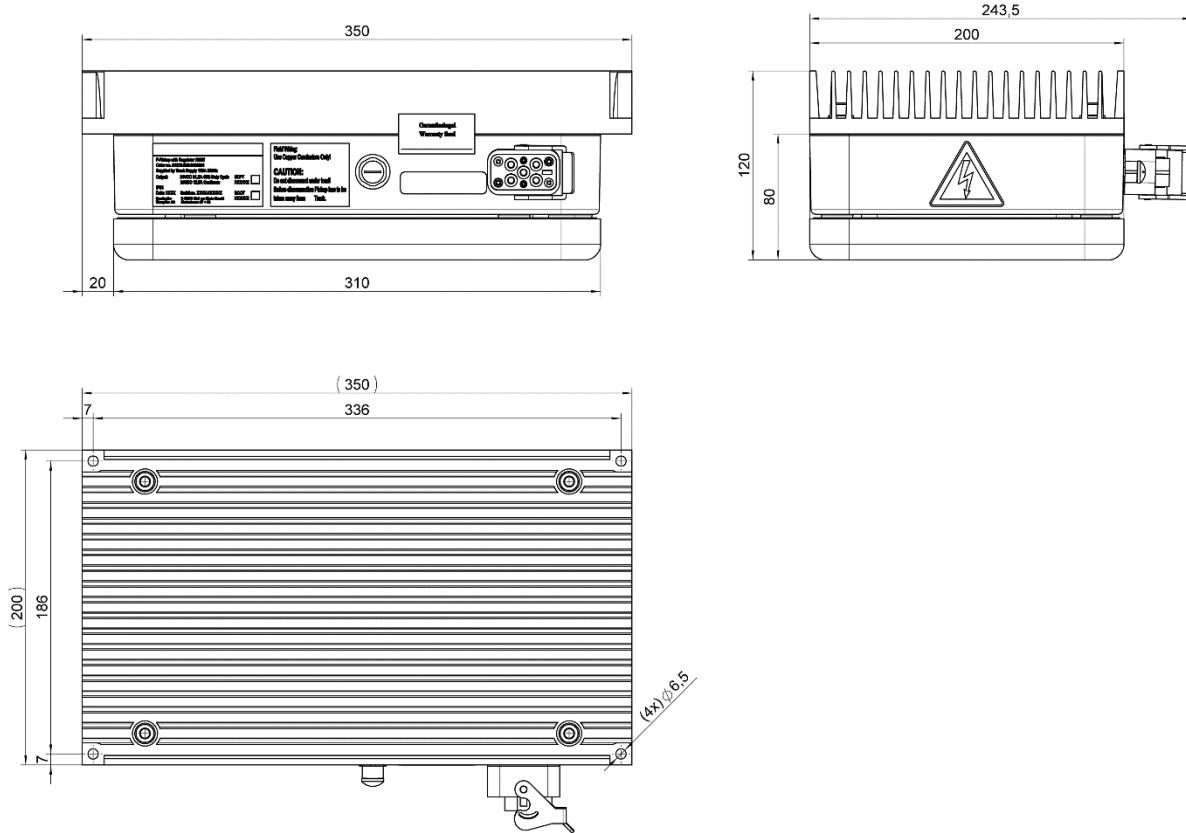
4.4 Mechanical Integration

- Dimensions see drawings
- Weight ~ 10.2 kg (without cables)
- Surface temperature Heatsink surface temperature may reach up to 70°C depending on operating conditions.
- Nominal air gap All given data refer to a nominal air gap of 10 mm between the lower edge of the pickup and the ground surface.
Out of this with attention of the operation manual MV9100-0032a for the ground installation an actual distance of 15 - 16 mm arises between the lower edge of the pickup and the top edge of the track cable. See chapter 8.2.1 "Positional Tolerances" with regard to other relevant tolerance.

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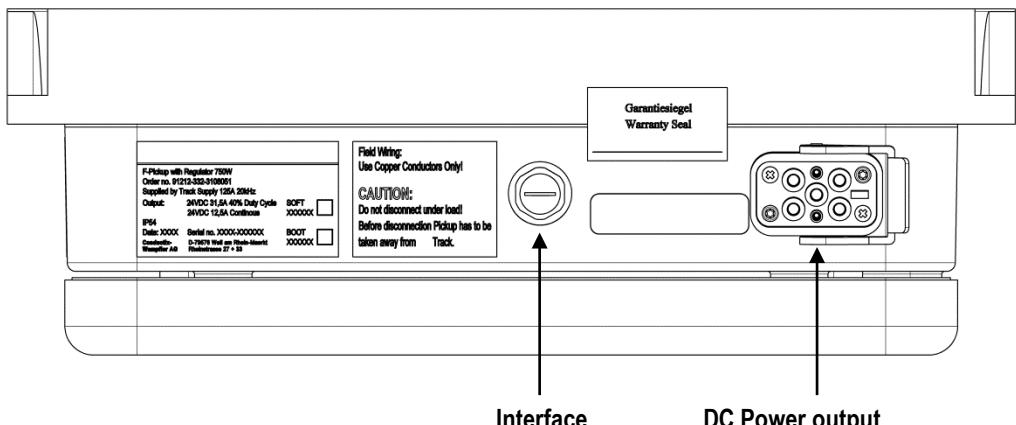


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4.5 Electrical Connections

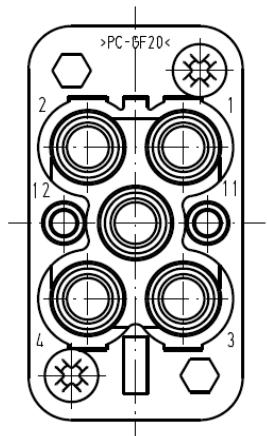
- DC Power output CQF 04/2 (ILME) or comparable



Connection cables must be ordered separately, see chapter 15.

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4.5.1 Connection of DC Power Output



PIN 1	+ 24 V DC
PIN 2	+ 24 V DC
PIN 3	0 V
PIN 4	0 V
PIN 5	Ground
PIN11	Pilot-contact 1
PIN12	Pilot-contact 2

(view: contact side at pickup)

Source: Harting

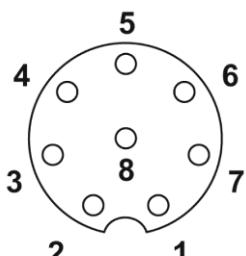


Ensure that all output lines are dimensioned according to the maximum output current. The output lines have to have sufficiently large cross sections to keep line voltage drops as small as possible.

ADVICE!

The pickup must be connected to the load using all four terminal outputs, two positive und two negative. The cable lengths of a common polarity must be equal to within 2% of their total length in order to facilitate good current sharing between the two conductors.

4.5.2 Connection of Interface



(view: contact side)

PIN 1	→ Isolated 24 V DC
PIN 2	→ Isolated 0 V DC <i>(150 mA max. Do not distribute externally: see chapter 8.1)</i>
PIN 3	→ COM <i>(common to the 3 output relays "Warning", "Error" and "Status")</i>
PIN 4	→ Enable <i>(Must be connected to allow the pickup to power up! See chapter 8.1)</i>
PIN 5	→ Warning
PIN 6	→ Error
PIN 7	→ Status <i>(Relays have potential free contacts, rated for 30 V DC / 5 A max.)</i>
PIN 8	→ Ground

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4.5.3 Ground Connection



Danger of life due to electric shock!

All electrical equipment must be connected together to the vehicle frame to ensure an equipotential bonding. The ground output of each plug must therefore be connected.

- Ensure that the heatsink is additionally connected in an appropriate manner to ground.
- Do not rely only on the connecting cables. The reason is that if the connection to the load is removed while the primary is active, then the pickup is still internally energized though the ground connection is broken.

4.5.4 ESD Protection



Danger of life due to electric shock!

Because the system is isolated, some electrical charges may accumulate on the vehicle depending on the surrounding conditions and the vehicle design.

- An adequate solution must be foreseen using a conductive floor coating together with for example conductive brushes, sliders, track rollers, wheels or similar methods for a connection to Earth, in order to reduce the likelihood of static charge build up and therefore ensure protection against electrostatic discharge (ESD).

5 Scope of Delivery

Cables and plugs, as well as material for mounting the device to a supporting structure (i.e. screws etc.) are not included in the scope of supply. Refer to chapter 14 "Accessories" for more information.

6 Transport and Storage



The transport company must be advised about any damage that has been detected after delivery. Prior to installing or starting operation with damaged components please consult the supplier.

ADVICE!

Refer to chapter 4 "Technical Data" for required transport and storage conditions.

7 Installation

7.1 Who is Authorized to Carry out the Installation



WARNING!

Risk of injury in case of insufficient qualification!

Incorrect handling can cause serious injuries to persons and heavy damage to property.

- All installation and commissioning work as well as maintenance work and disassembly have to be carried out by qualified staff (IEC 364 respectively CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and national safety rules).

Qualified staff according to the safety regulations are persons who are familiar with the assembly and installation of the energy supply system and who have the appropriate qualifications.

7.2 General Advice for the Installation



WARNING!

Risk of injury due to improper assembly and initial commissioning!

Improper assembly and initial commissioning may cause heavy injuries and considerable damage to property.

- Unpack the components after receiving or before installation.
- Check the components carefully for damage that may have occurred during transport or storage (damage to housings and insulation, missing parts etc.).
- Check data on the identification plate to make sure that the components meet the requirements with regard to nominal power and voltage and that they are matching parts to the regulator used.
- Check completeness of the documents and conformity with the delivered components.
- Mount the pickup on a flat plane.
- Ensure that a permanent secure fixing is possible.



ADVICE!

An improper installation of the energy supply system has a negative impact on the function, the efficiency and the lifetime of the device. It is therefore important to observe the specification for the choice and place of installation. The guarantee will expire if this is not observed!

Follow the instructions of chapter 7.4 for attaching the pickups to the support structure. See also chapter 4.5.3 "Ground Connection" for making the connection to ground.

7.3 Electrical Regulations



The general electrical operating conditions according to VDE 0100 (installation and operation of electrical equipment up to 1000 V) have to be observed. If necessary apply the local regulations when they go beyond or differ from these requirements.

7.4 Recommended Connection

7.4.1 Connection of Pilot Pins

Shorter pilot pins are used in the power connector (pickup side) to provide a signal to the pickup when the load is connected. Breaking the pilot connection while unplugging will signal to the pickup to shutdown before the main contacts are disconnected, thus preventing DC arcing in the connectors (see also chapter 4.3 "Safety Protection").

If the pilot signal is shorted in the plug on the pickup side, the pickup will not be able to detect when the cable is disconnected at the load side. No protection against DC contact arcing can be expected in this case, nor would the output voltage be disabled once the cable disconnected. This could result in an unsafe situation.

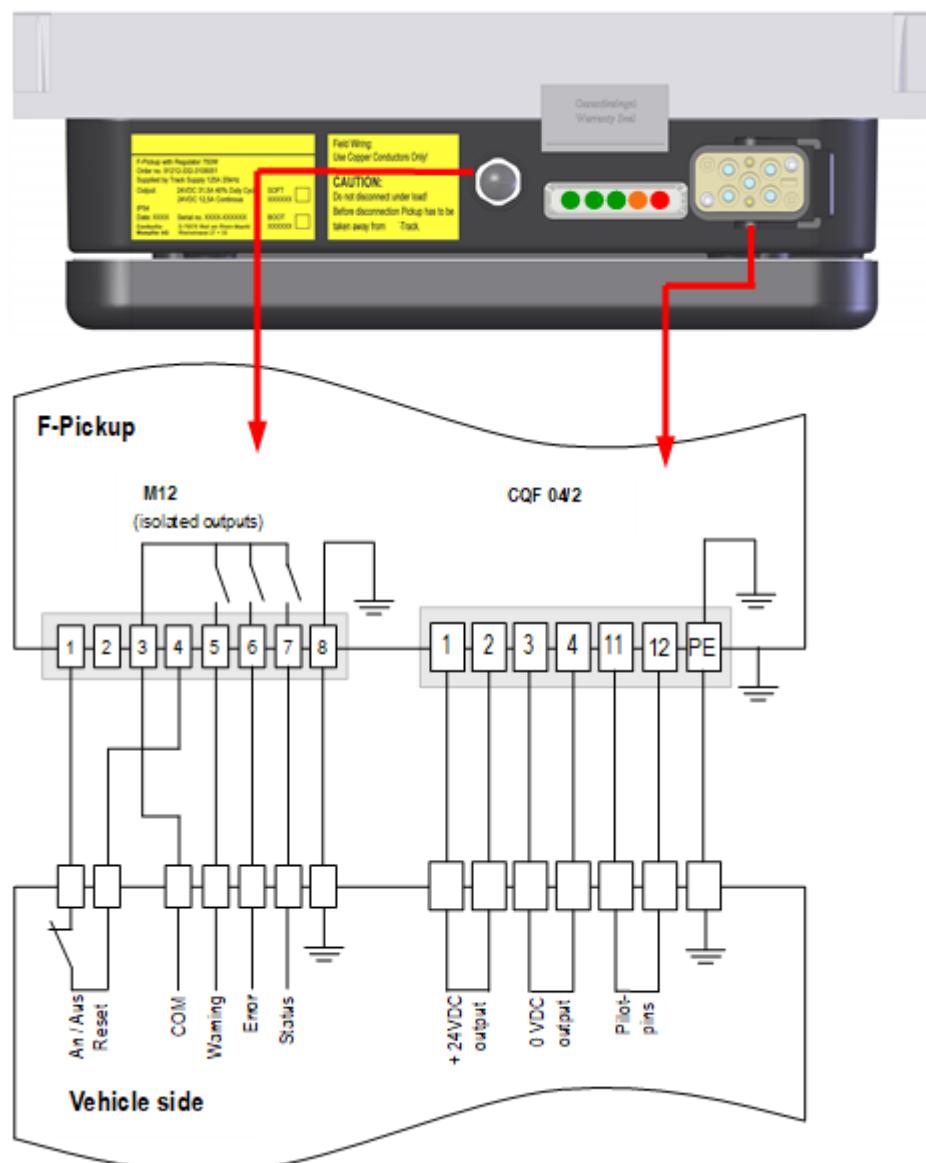
In order to fully use the benefits of the pilot pins in case the power output cable is disconnected, we recommend shorting the pilot pins on the side of the load connected to the pickup. Only this way is it assured that the pickup switches off when the cable is disconnected, be it on the pickup side as well as on the load side. Refer to following examples for more details.

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7.4.2 Example: Using the Interface (recommended!)

Below is an example of connection presenting pickup version 91212-332-3108051, when both the power output and the interface connection are used (recommended!).

The interface connection allows turning on and off the pickup even under load and provides as well an easy way to reset the device in case a fault has been detected. These basic functions are fulfilled by the switch connected between pins 1 and 4 on the vehicle side. Due to the low voltages involved and the isolated characteristics of the interface connections, the switch requires very basic isolation and ratings (24 V DC / 0.1 A).



Initial status of relays, please see chapter 10.

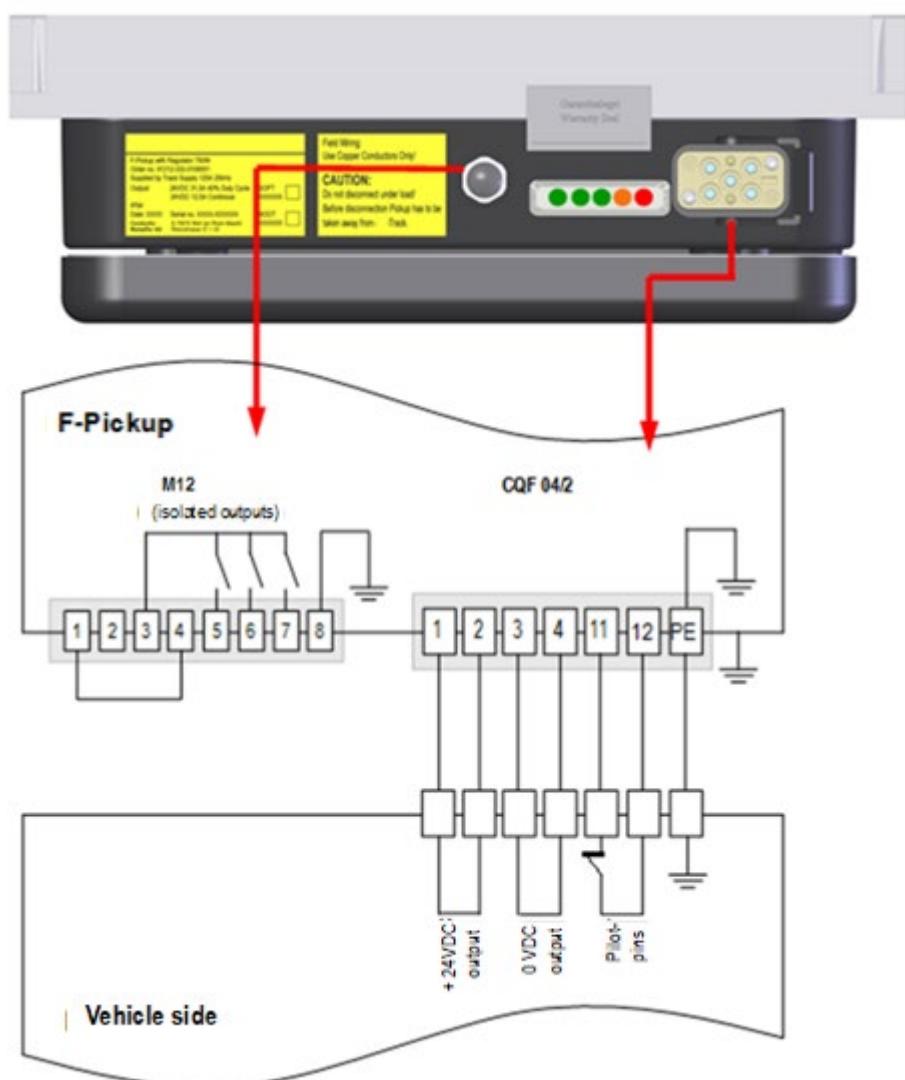
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7.4.3 Example: If the Interface is not Used

Below is an example of connection with pickup version 91212-332-3108051 without using the interface. **Even if signals available through the interface plug are not being used, it is still necessary to connect pin 1 to pin 4 for the pickup to start (e.g. with "Enable plug set" 9100-400-3089971).**

Pilot pins are not designed to be used as an ON/OFF switch and it is thus recommended not to open the pilot connection under load. However, disconnecting the pilot pins will reset the pickup. Therefore, this procedure can be used to reset a fault in case of automatic shutdown. This is the purpose of the switch shown in the following illustration, connecting pins 11 and 12 on the load side. Refer to chapter 10 "Fault and Diagnose" for more information.

Voltage present on the pilot pins is not isolated from the main output power. Make sure to use a switch with suitable isolation to ground. Rating between contacts is 24 V DC / 0.1 A.



Initial status of relays, please see chapter 10.

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7.5 Place and Conditions of Installation



WARNING!

Risk of injury due to improper assembly!

Improper assembly may cause heavy injuries and considerable damage to property.

- Install the pickup in an environment and under conditions as specified in this document only.
- The pickup is to be mounted in a horizontal position, heatsink on top and attached to a solid base.
- Ensure free space around pickup, to prevent the influence of ferromagnetic material as well as to provide sufficient cooling air circulation.



Available output power as specified in this document strongly depends on the ambient conditions of the device. Note the appropriate instructions in this document.

ADVICE!

7.5.1 Position

A horizontal position is recommended to maximize the efficiency of convection cooling. If the pickup is positioned with an angle, i.e. not horizontal, the maximum average power available may be reduced. Positions where the heatsink is facing down are not allowed.

Pickups are to be mounted parallel to the primary track and centered between the cables (illustrated below). There should be a 10 mm air gap between the bottom of a pickup and the surface of the floor (provided that the primary track cables are installed as specified in the installation manual for floor systems) in order to ensure the specified output power.

7.5.2 Air Flow Required

The heat power of the pickup is dissipated by convection and radiated cooling. Ensure that free flow of air (min. 0.1 m/s) is guaranteed around the device at all times. It is essential to make sure that the air flow is not hindered in any way by objects and that the device is protected from additional heating, i.e. exposure to sun light or hot air flow from inverters, proximity to brake resistors.



WARNING!

Risk of injury due to improper assembly!

If the pickup is mounted improperly, the performance of the device will be limited. This may cause damage and the lifetime will be reduced.

- Confined areas should be adequately ventilated, allowing also for the heat generated by the pickup which can reach about 50 W under full load conditions.

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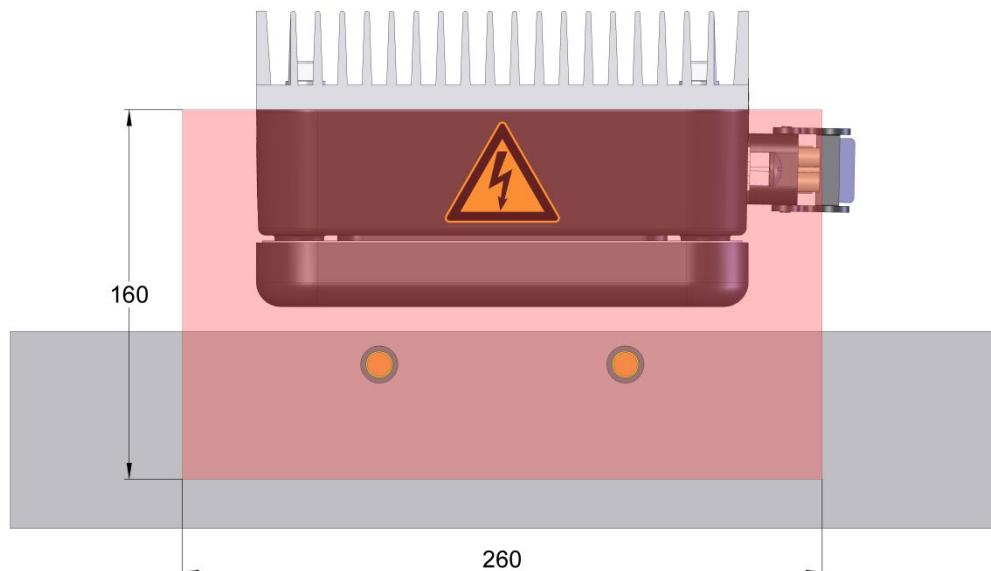
7.5.3 Proximity to Iron and Steel (ferromagnetic materials)



Adverse effects due to ferromagnetic materials!

Ferromagnetic material will influence the characteristics of the pickup, i.e. lower output power, production of additional heat/losses, etc.

- Refer to the entire documentations related to floor systems to make sure that no material in the floor and on vehicles will have a negative impact on the pickup.
- We strongly recommend to respect the specifications for areas free of ferromagnetic material as shown in the illustration below, and even to go beyond these requirements whenever possible.



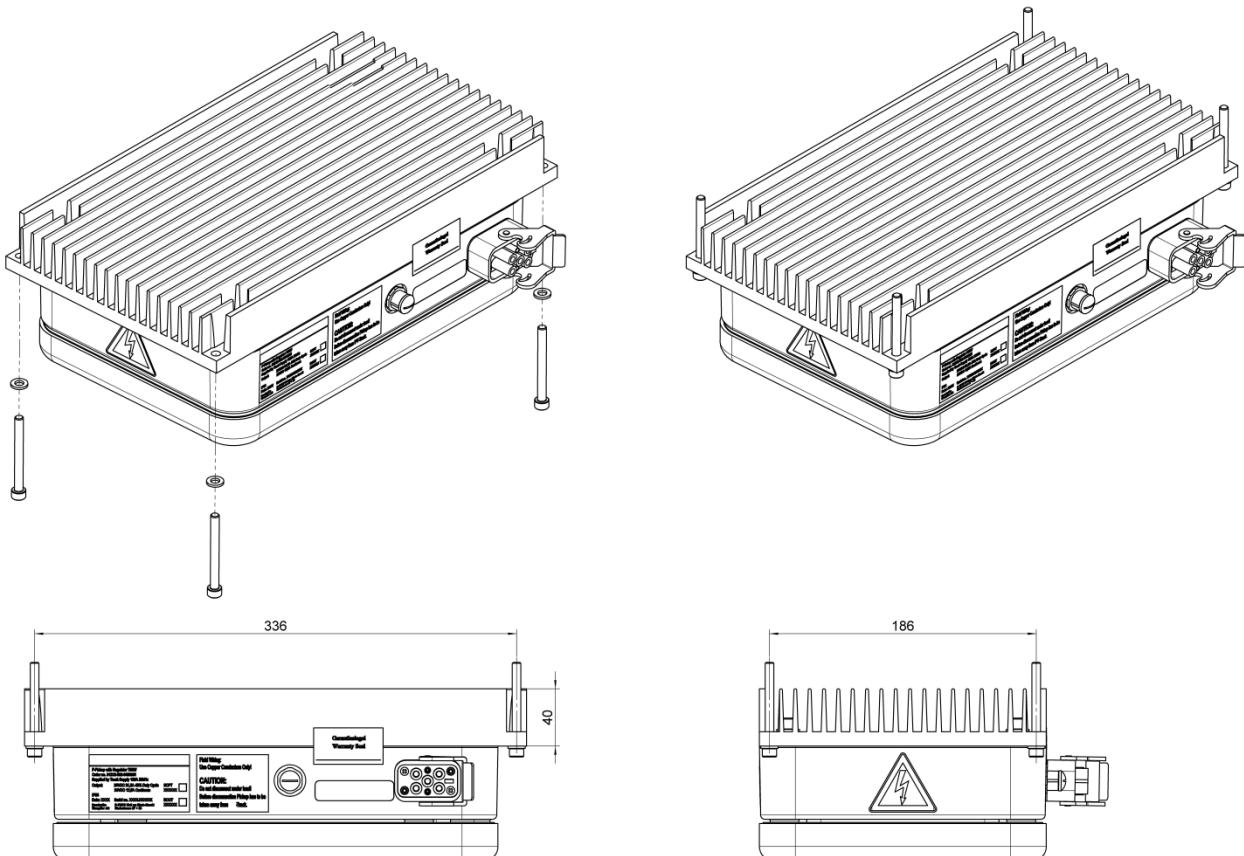
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7.5.4 Attachment Points

Attaching a pickup to a supporting structure must be done without opening the housing. Open the housing will terminate the warranty.



Make sure that the pickup is fixed properly and fixing is not influenced negatively by shocks and vibrations.

7.5.5 Additional mechanical means of protection



WARNING!

Risk of burns due to hot metallic objects!

Metallic objects can be warmed up inductively. Especially small parts can become very hot.

- Remove small components – particularly those made of ferromagnetic materials – lying on the ground in front of the pickup.
- Therefore integrate e.g. a cleaning brush on the vehicle in front of the pickup in order to free the inductive transmission path from metallic small components.

8 Operation

8.1 Basics

8.1.1 Powering Up

The primary track being turned on, once a suitable magnetic field is detected, and if the pilot pins (pins 11 and 12 of the power output connector) are shorted, the pickup will be ready to be turned on. The output voltage will however appear at the power output of the shrouded pin connector only if the pickup is enabled at the interface plug. Enabling the pickup can be done in two different ways:

- by making a connection between pins 1 (internal isolated 24 V) and 4 (enable)
- by connecting an external 24 V supply between pins 2 (0 V isolated) and 4 (enable pin).
In which case, the + pole goes to pin 4

Note that when the pickup is in the disable mode (pin 1 and 4 disconnected), the internal isolated 24 V supply is only suitable to supply a starting signal to the pickup itself; do not distribute externally! When the pickup is enabled and the "status" relay is closed (between pins 3 and 7), the maximum current allowed is 150 mA.



When the interface is not used:

Even if signals available through the interface plug are not being used, it is still necessary to connect pin 1 to pin 4 for the pickup to start!

8.1.2 Powering Down

Turning off the primary track will have the immediate effect of turning off all pickups. They do not need to be powered down individually before turning the primary track off. However, since turning off a pickup resets the error mode, turning off a single pickup may be convenient when a fault occurs on a single vehicle. Please, refer to chapter 10.4 "Reset" to find out more on how to reset pickups.

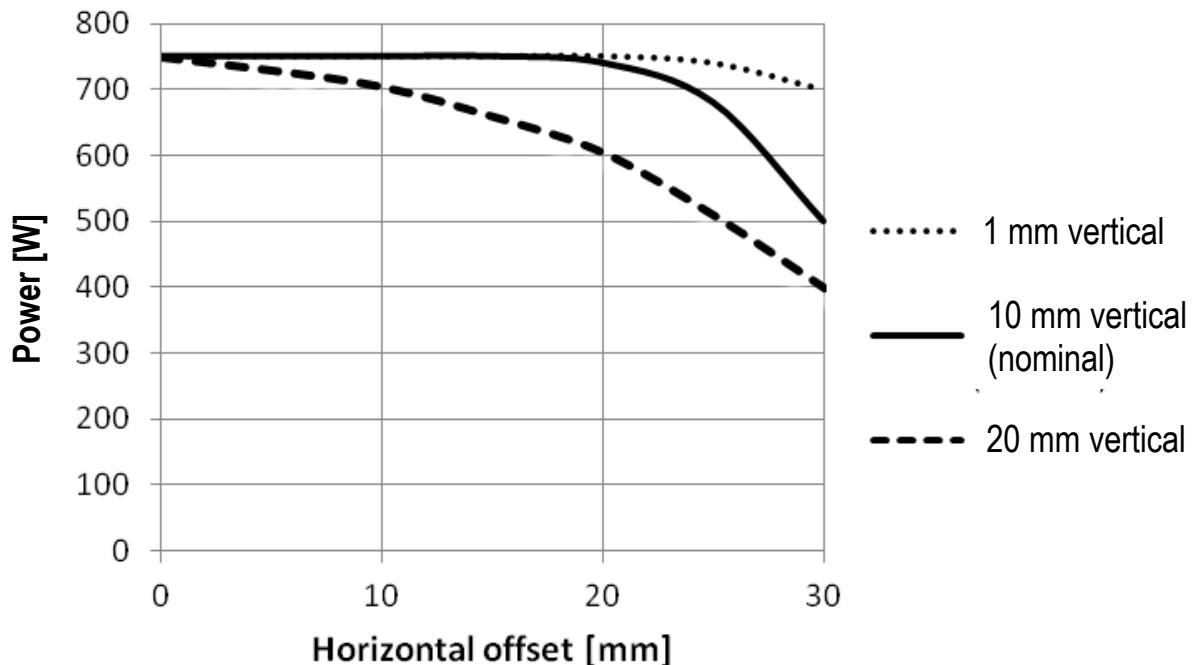
If the need of turning on and off a pickup exists even under load, using the interface plug is the best way to proceed; simply break the contact with pin 4. It is not recommended to use the pilot pins to turn off a pickup under load.

When a pickup is turned off, the energy stored internally is discharged to reduce the output voltage to a minimum.

8.2 Advanced

8.2.1 Positional Tolerances

Since the power rating of a pickup is dependent on the strength of the primary magnetic field, it is also dependent on the relative position of the pickup to the track. The power ratings are defined for a nominal air gap of 10 mm (between floor and bottom edge pickup) and a centered horizontal positioning over the primary track. The following curves show the typical output power over a normal straight track as a function of 1. vertical displacement (horizontal offset constant at 0 mm) and 2. horizontal offset (vertical offset at 10 mm). The non variable parameter is understood to be at nominal value. The power rating of the pickup will be affected by the layout of the track, i.e. bifurcations, curves, influence of ferromagnetic material etc. See also chapter 7.5 "Place and Conditions of Installation".



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8.2.2 Parallel Operation of Pickups

The pickups described in this documentation can be operated up to three together in parallel (more upon request). By parallel operation it is understood that only the main voltage output of several pickups are connected together (exception made of the ground connection see chapter 4.5.3 "Ground Connection". In other words, connections with pins 2, 4, 11 and 12 must remain separate for each pickup.



DANGER!

Danger of life due to electric shock!

When several pickups are directly connected to a common bus, voltage will be present if a plug is disconnected on the pickup side. Please note that the interface makes it possible to detect when a power plug is disconnected while other pickups are still powered up.

- Do not rely only on the connecting cables. The reason is that if the connection to the load is removed while the primary is active, then the pickup is still internally energized though the ground connection is broken.
- Switch off the primary side.
- Check if the status LED's of all devices are not on.
- Ensure that the power supply lines are currentless and de-energized.

When the interface is used:

Due to their isolated properties, it is possible to interconnect the M12 interfaces together. However, we recommend to wire each signal separately to determine precisely which signal comes from which pickup and therefore to be able to take corresponding action independently (i.e. if a pickup entered an error mode, it can be reset without having to completely stop the vehicle).

As mentioned above, the detection of a disconnected power plug is possible. A closed "Warning" relay and open "Status" relay, while the controls of the vehicle still provide an "enable" (or ON) signal, is characteristic of such a case and therefore of a possibly unsafe situation if other pickups are still powered up

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8.2.3 Info-Tips for Operation with the Interface

The signals that are available through the M12 interface plug are described hereafter, including their initial state (open or closed). For more details on available information and diagnose see chapter 10 "Fault and Diagnose":

- Error relay (pins 3 – 6)
Closes when a magnetic field acceptable to ensure the minimum function is detected, and that no error is present. This is however no guaranty for the deliverable output power (refer to chapter 7.5 "Place and Conditions of Installation"). Opens when an error is detected or track is turned off.
- Warning relay (pins 3 – 5)
Is normally open. Closes when approaching limits of operations (i.e. temperature, overload) to give the user the opportunity to take the signal into account and prevent an automatic shutdown which could cause the vehicle to stop in a critical zone and/or at a critical moment. Provides also some information on the pilot pin function. See also chapter 8.2.2 "Parallel Operation of Pickups".
- Status relay (pins 3 – 7)
Is normally open. Closes when the main output has been enabled and the regulation functions are fully ready for operation with load. The state of this relay is no guaranty for the accuracy of the voltage output i.e. in case of overload the voltage will be lower than the nominal value specified.

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8.2.4 Battery Charging



The device can be seen as a voltage source and can be used for trickle charging or U-charging, when the following points are considered:

ADVICE!

- The pickup has no battery management and no charging algorithms. Therefore, monitoring of the battery by customer side equipment and measures is necessary.
 - Ensure that the charging is carried out proper according to manufacturer's and battery type's parameters. Use lead gel or lead acid batteries, others on request.
 - Monitor the battery temperature by using an appropriate sensor to avoid overheating of the battery.
 - Ensure that the battery is not over- or undercharged by using an over- and low voltage monitoring.
 - Only install completely charged batteries. Only in this way the trickle charging can be carried out.
 - Ensure that the charging current, which depends on the battery capacity and the charge condition, does not overload the pickup.
 - If the current rises short-time above the typical value of 34 A, the pickup will carry out an auto-reset by what the current will be pulsed.
- The connection between battery and pickup must be in accordance with national guidelines for electrical connections.
- The responsibility for design and operation of such a constellation lies with the system supplier as well as with the operator.



Conductix-Wampfler recommends testing the usage of the described pickup. In case of doubt, previously discuss the usage with Conductix-Wampfler before the pickup is used in greater quantities in the situation described above.

ADVICE!

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8.3 Safety Precautions



Danger of life due to electric shock!

Pickups are not designed for independent operation. They have to be operated in conjunction with corresponding components.

- Never operate a pickup showing damage or that is in a non touch proof state.
- Do not perform any work on the pickup while in operation.



Risk of burns due to hot surfaces!

During or after operation surfaces of the pickup may be hot.

- Prevent access to hot surfaces if necessary. Refer to section 4.4 "Mechanical Integration" for more information.



Risk of injury due to improper handling!

Improper handling may cause heavy injuries or damage to properties.

- Never separate pickup from its load during operation. Massive electric arcs occur.
- Make sure that the device cannot start up unintentionally.
- Do not connect or switch a charged or powered pickup directly on to any batteries. Connection should only take place when the pickup is in a powered down state.
- Connect batteries observing the correct polarity.
- Avoid negative voltages on the pickup as this can cause damage.
If a pickup is connected with a battery, the pickup will draw a small amount of power from the battery - even if it is switched off – and the battery will discharge.
- Ensure an appropriate air flow of min. 0.1 m/s around the pickup (see also chapter 7.5 "Place and Conditions of Installation").

9 Warnings and Cautions



Danger of life due to electric shock!

Pickups can contain voltage even in a disabled mode (OFF), even if status LED's have gone out. Improper handling can result in electric shocks or burns as well as damage to the pickup.

- Do not perform any work on or around the device while in operation.
- Do not open, do not insert any objects inside and do not touch connection terminals.
- Make sure that connections are not removed under dangerous conditions, i.e. under load.
- The only safe means of working on circuits connected to the device is to ensure that the primary track is switched off and then to disconnect physically the DC power output plug.
- Wait at least 5 minutes before touching connection terminals to be sure that no energy remains stored internally by capacitors.



Risk of injury in case of insufficient qualification!

Incorrect handling can cause serious injuries to persons and heavy damage to property.

- All installation and commissioning work as well as maintenance work and disassembly have to be carried out by qualified staff (IEC 364 respectively CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and national safety rules).
- Observe national safety rules.

Qualified staff, according to safety regulations, are persons that are familiar with the installation, commissioning and operation of the energy supply systems and that have the appropriate qualifications.



Danger caused by application not in accordance with regulations!

The pickup is only foreseen to be operated in conjunction with matching components.

- If you are not sure whether components match, contact Conductix-Wampfler. Do not put into operation before!
- Route power and control cables separately so that no interference can occur.
- Only use cables with a cross-section suitable for the given currents.
- Note polarity when connecting any device to the output of the pickup.



Risk of burns due to hot surfaces!

During or after operation surfaces of the pickup may be hot.

- Prevent access to hot surfaces if necessary. Refer to section 4.4 "Mechanical Integration" for more information.

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Danger caused by unsafe operation!

Damaged pickups can cause serious damage.

- Do not install an obviously damaged device.
- Do not take damaged devices into operation.
- Ensure that protection device and other preventive measures taken comply with the applicable regulations.
- Make sure that all connected circuits fulfill at least the same safety standards as the pickup and fulfill requirements for safe operation.

10 Fault and Diagnose

10.1 Basics



Definition LED's:	(LED red)	→	Error LED
	(LED orange)	→	Warning LED
	(LED green)	→	Status LED
	(LED green)	→	5 V LED
	(LED green)	→	12 V LED

The interface plug M12 provides three potential free relays with a common pin (pin 3). For more information on relays, see also chapter 8.2.3 “Info-Tips for Operation with the Interface“.

- “Error” relay (pin 3 - 6): Open when primary power absent or in error state. Closed under normal conditions.
- “Warning” relay (pin 3 - 5): Initially open. Closed only to signal a warning.
- “Status” relay (pin 3 - 7): Initially open. Closed once the pickup is enabled and ready for operation with load.

The state of operation of a pickup can be determined more precisely using the LED display and the interface plug shown above. Relays and LED's provide the same information though LED's may display additional information by remaining on or blinking.



Risk of unsafe operation!

Damaged pickups can cause heavy damage to property.

- Never operate a pickup when it is out of order or it might be.

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10.2 Normal Status

When a pickup is disabled (primary track is on but pickup turned OFF) the following information is available:

- (red): “Error” LED **off** + “error” relay (pins 3 - 6) closed
- (orange): “Warning” LED **off** + “warning” relay (pins 3 - 5) open*
- (green): “Status” LED **blinking** + “status” relay (pins 3 - 7) open
- (green): “5 V” LED **on** (5 V supply available)
- (green): “12 V” LED **on** (12 V supply available)

When a pickup is enabled (primary track is on and pickup turned on) and working under normal conditions of operation as specified in this documentation, the following information is available:

- (red): “Error” LED **off** + “error” relay (pins 3 - 6) closed
- (orange): “Warning” LED **off** + “warning” relay (pins 3 - 5) open*
- (green): “Status” LED **on** + “status” relay (pins 3 - 7) closed
- (green): “5 V” LED **on** (5 V supply available)
- (green): “12 V” LED **on** (12 V supply available)

* = **Note**: in addition, warning information may be shown through a closed “warning” relay as well as the orange LED being on. This does not necessarily mean that the pickup is being operated under abnormal conditions; it may be that the pickup operates in conditions close to its limits while still within its specifications. Refer to chapter 10.3 “Signals and Meanings” for more information about possible meanings of warning signals.

10.3 Signals and Meanings

Warning signals provide detailed information according to how they are displayed (on, blinking, off) and in which context (which state for other LED's/Relays). Refer to Table 1 for information based on relay states and to Table 2 when based on LED display.

Note that if the primary track supply is not on or if the pickup is not correctly positioned over the primary track cable, all the LED's are off and all the relays are open:

- (red): “Error” LED **off** + “error” relay (pins 3 - 6) open
- (orange): “Warning” LED **off** + “warning” relay (pins 3 - 5) open
- (green): “Status” LED **off** + “status” relay (pins 3 - 7) open
- (green): “5 V” LED **off** (5 V supply not available)
- (green): “12 V” LED **off** (12 V supply not available)

Operating Instruction



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	Status relay closed	Status relay open	Error relay open
Warning relay is closed	see a) or b)	see c)	see d)
Warning relay is open	Normal operation: see chapter 10.2	Normal operation: see chapter 10.2	see e)

Table 1 Relay outputs and meaning

	Green LED remains ON (Status relay closed)	Green LED is blinking (Status relay open)	Red LED remains ON (Error relay open)
Orange LED remains ON (Warning relay closed)	see a)	--	--
Orange LED is blinking (Warning relay closed)		see b)	see c)
Orange LED is OFF (Warning relay open)		Normal operation: see chapter 10.2	Normal operation: see chapter 10.2
			see e)

Table 2 LED display and meaning

- a) The maximum peak power available is exceeded. Refer to chapter 4.1 "Electrical Data", 7.5 "Place and Conditions of Installation" and 8.2.1 "Positional Tolerances" to make sure the requirements in peak power match the actual conditions of operation.
- b) The internal temperature is approaching maximum ratings. If the average power consumed is compatible with the specified technical data (chapter 4.1 "Electrical Data" and 4.2 "Environmental Data") and together in accordance with chapter 7.5 "Place and Conditions of Installation", this warning will have no consequence and the system may be further operated as it is. On the other hand, if such a warning appears in the long run, whereas it was never displayed before, this may indicate for example a strong soiling of the cooling elements and we therefore strongly recommend referring to chapter 11 "Maintenance". This situation may lead to an over temperature error (see case d).
- c) Automatic shutdown initiated by the pilot pins function; the power plug is not connected.
- d) The maximum internal temperature has been exceeded. The warning signal (LED blinking or relay closed) will remain until the internal temperature has decreased to an adequate value. The pickup will however remain in an error mode until it is reset (see chapter 10.4 „Reset“). Check the compatibility of the average power required with the device specifications (chapter 4.1 "Electrical Data" and 4.2 "Environmental Data) and the cooling requirements (chapter 7.5 "Place and Conditions of Installation").
- e) The pickup has automatically shutdown. See chapter 4.3 "Safety Protection" for some information. Reset the pickup (see chapter 10.4 „Reset“) and observe the conditions of operation if the fault were to reproduce. If a fault cannot be attributed to external conditions of operation the device is out of order and needs to be repaired by a specialist. Refer then to chapter 12 "Repair".

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10.4 Reset

When the interface is used:

If a connection with the interface plug is available, resetting a pickup after a fault simply requires to disable it (open contact pin 1 - 4) then to enable it again (close contact pin 1 - 4).

When the interface is not used:

When the interface is not used, resetting a pickup can be done using the pilot pins; disconnecting then reconnecting the pilot pins together will reset the pickup.



Pilot pins are not designed to be used as an ON/OFF switch and it is thus recommended not to open the pilot connection under load.

ADVICE!

In all cases:

If the pickup leaves the positional tolerances described in chapter 8.2.1 "Positional Tolerances" or if the pickup is overloaded at an increased horizontal/vertical offset, an automatic reset is carried out. The pickup will then automatically restart after this delay if enabled (i.e. if pin 1 and 4 are connected together).



Moving the pickup away from the track, or turning off and back on the primary track supply will also reset the pickup.

ADVICE!

11 Maintenance



There is no specific maintenance required other than checking regularly that a free air flow for cooling is given and that there are no damages visible from the outside. Strong soiling or obstacles on the heatsink that would prevent sufficient cooling conditions should be avoided.

12 Repair



Risk of injury due to improper repair works!

Improper repair works may cause heavy injuries to persons and damage to properties.

- Only trained staff or Conductix-Wampfler's technicians are allowed to carry out repair works.

As a rule, a local analysis of error or repair is not possible. Therefore a transmittal to Conductix-Wampfler is necessary. In this case please contact our service team for specific instructions.

Be sure to include the following information when returning parts to Conductix-Wampfler:

- Product name
- Material number
- Serial number
- Application/Installation, in case with a brief description
- Wiring schematic of overall system (if available)
- Photos (if available)
- Fault description
- Presumption, what could have caused the fault

13 Disassembly and Re-Use



WARNING!

Risk of injury due to improper disassembly!

If it is necessary to exchange a pickup due to damage or to install it in another place, verify that no damage will occur during disassembly.

- For installation in another place observe the described mounting and commissioning instructions.
- All electric work has to be carried out by qualified staff (IEC 364 respectively, CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and national safety rules). Qualified staff, according to the safety regulations, are persons that are familiar with the installation, assembly, commissioning and operation of the energy supply system and that have the appropriate qualifications.

13.1 Advices for Disassembly

1. Disconnect the system from the mains voltage.
2. Make sure the system cannot be powered up again accidentally.
3. After disconnecting the track supply from the supply voltage wait at least 5 minutes for internally stored energy to discharge.
4. Dismount the pickup.
5. Dispose of components in a specific way → Recycling

13.2 Recycling



CAUTION!

Environmental damage due to incorrect disposal!

The unit contains components that have to be disposed of in a specific way.

- If it is not used any longer, it will have to be recycled properly.
- Dispose the materials separately in accordance with the current regulations, i.e. separate circuit boards, aluminum heatsink, cable (copper) etc.

14 Accessories

14.1 Power Output



The output line, which comes out of the pickup, can be ordered on request from Conductix-Wampfler. However, in principle the in chapter 4.5.1 described requirements regarding the choice of the cable cross-section apply.

Connecting line 2.5 m one-sided with plug: 91212-339-3124279

Details of this connecting line, see table below. The required materials for connecting the output line via a plug are listed. Special tools are then needed for the assembly. See chapter 15 "Tools". Due to on-site circumstances further material can be necessary.

Description	Quantity needed	Material Number ILME	Material Number Harting
Hood (thermoplastic)	1	CQ 08VK	19 12 008 0429
Cable gland (thermoplastic)	1	CRQ 16	19 12 005 5157
Crimp terminal, male insert	1	CQM 04/2	09 12 006 3041
crimp contacts male 4 mm ² / AWG12	5	CXMA 4.0	09 32 000 6107
crimp contacts male 1.5 mm ²	2	CDMA 1.5	09 15 000 6101

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14.2 Interface



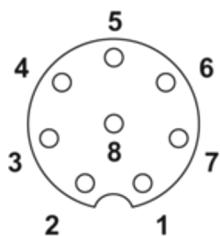
Source: Phoenix Contact

The wire for this interface, which comes out of the pickup, can be ordered separately from the following manufacturers. Details see table or on the basis of the respective manufacturer's website.

Alternatively, a compact enable-plug is available which allows an auto-start function of the pickup. Enable-plugs (set of 5 pcs.) can be ordered from Conductix-Wampfler under material number 91000-400-3089971.

Note: this plug does not allow any remote ON/OFF function nor any of the diagnoses possibilities. Refer to the product documentation for more information.

Description	Material Number Conductix-Wampfler	
Enable plug set	91000-400-3089971	
	Material number „Phoenix Contact“ http://www.phoenixcontact.com	Material number „Binder Connector“ http://www.binder-connector.de
5 m shielded cable, preassembled with 1 male connector	1407848	79 3579 3508
5 m unshielded cable, preassembled with 1 male connector	–	79 3479 3508
Male connector, preassembled with wires	1523492	09 3481 700 08
Male connector, with solder terminals only	1542758	–



The information below is for reference only. It relies on the 2012 specifications of the manufacturers for the material mentioned in this paragraph only. In case of any doubt, or when using different material than those mentioned above, it will be necessary to check the correspondence between the pin number and the color of each wire in order to avoid possible damage to connected devices.

PIN 1	→	white	PIN 5	→	grey
PIN 2	→	brown	PIN 6	→	pink
PIN 3	→	green	PIN 7	→	blue
PIN 4	→	yellow	PIN 8	→	red or shield

Operating Instruction



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15 Tools

Description	Manufacturer	Material number
Crimping tool	Han C and HAN D contacts Harting	09 99 000 0021
Removal tool for Han C contacts	(Crimp contacts power) Harting	09 99 000 0305
Removal tool for Han D contacts	(Crimp contacts control) Harting	09 99 000 0052

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