Operating Instructions

Track Supply 16 kW IP54

80 A/125 A at 400 V/480 V

Order Number

91008-111-3130923 (80 A, 400 V, RAL 7035 - light gray)
91012-111-3130924 (125 A, 400 V, RAL 7035 - light gray)
91008-111-3130925 (80 A, 480 V, RAL 7035 - light gray)
91012-111-3130926 (125 A, 480 V, RAL 7035 - light gray)
91000-111-3130914 (configurable version)

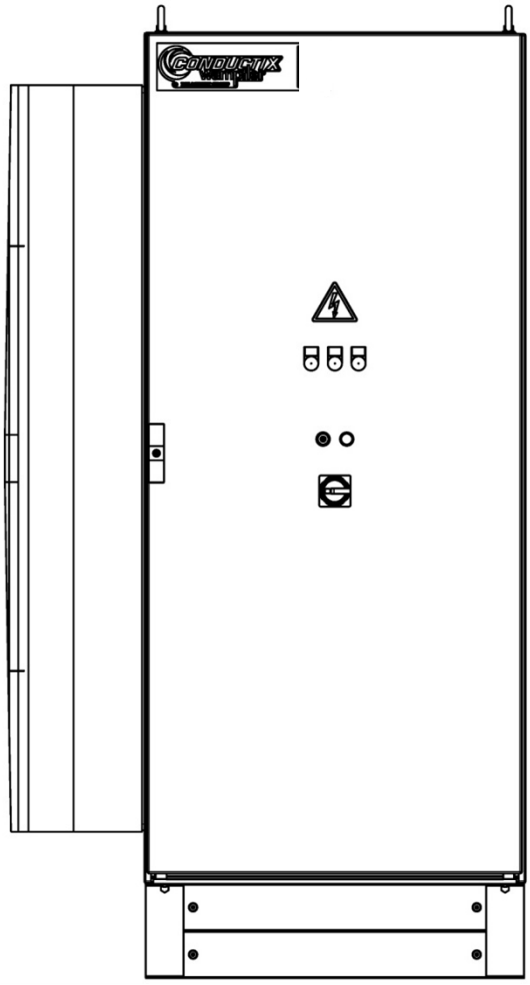

Figure shows conditioned variant

Operating Instructions

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Contents

This operating instruction is based on the following Documentation-No.: OM09100-0138e-EN!

Important:
The names used in the following document are copyrighted as brands and are in the property of the respective companies. We reserve the right for technical modifications of illustrations and specifications in these operating instructions that serve for the improvement of the system and its functions. For system details please see the respective documentation. Always observe the system documentation for any works at the system or for the operation of the system. Reprinting and copies, even in excerpt, only with our approval.

1 General Advice

1.1 Information about these Operating Instructions

This document facilitates safe and efficient handling and use of the equipment.

It is an integral part of the equipment and must be kept in its immediately vicinity to allow access by personnel at any time. Prior to commencing any work, the personnel must have carefully read and understood these operating instructions. It is a basic requirement for safe working that all safety and procedural instructions contained in these operating instructions are complied with.

Local accident protection regulations and general safety guidelines for the application field of the device also apply.

Illustrations in this documentation are for basic comprehension and may deviate from the real design of the equipment.

In addition to these operating instructions, the attached instructions for installed components also apply.

1.2 Limitation of Liability

All information and instructions in these operating instructions have been compiled with due regard to the standards and regulations in force, best engineering practice, and the findings and experience we have accumulated over many years.

The manufacturer is in no way liable for damages resulting from:
- Failure to comply with these operating instructions
- Improper use
- Use by untrained personnel
- Unauthorized modifications
- Technical changes
- Use of unauthorized replacement parts and accessories

The actual scope of delivery may differ from the explanations and illustrations described here for special variants, if additional order options are utilized, or due to the latest technical changes.

The obligations agreed upon in the delivery agreement and our General Terms of Business apply, as well as the delivery conditions of the manufacturer and all regulations applicable at the time the contract was concluded.

All products are subject to technical modifications in the context of improvement of usage properties and further development.

1.3 Copyright

1.4 Spare Parts

WARNING!

Safety risk due to wrong spare parts!
Wrong or faulty spare parts can impair safety and result in damage, malfunction or complete failure.
- Use only original spare parts of the manufacturer!

ADVICE!

The product warranty expires with the use of unauthorized spare parts. Spare parts must be ordered from your licensed dealer or directly from Conductix-Wampfler. Address see last page of these instructions.

1.5 Material Defects

The regulations about material defects are listed in the General Terms and Conditions of Business.

1.6 Technical Support

For technical support please contact our staff from the Customer Support Department.
Moreover, our staff is always interested in new information and experiences, which will arise from the application and which might be valuable for the improvement of our products. Please also contact our customer service in this context.

2 Safety Advice

2.1 Explication of Symbols

Safety and hazard information is identified in this document by symbols. Signal words are used to indicate the degree of hazard. Always observe safety instructions and work carefully to avoid accidents, personal injury or property damage!

DANGER!

… indicates an imminent dangerous situation, which may cause deadly accidents or serious injuries, if not avoided.

WARNING!

… indicates a possibly dangerous situation, which may cause deadly accidents or serious injuries, if not avoided.

CAUTION!

… indicates a possibly dangerous situation, which, if not avoided, may result in moderate or minor injury or property damage.

ADVICE!

Advice and recommendations:
… refers to useful advice and recommendations as well as information for an efficient and trouble-free operation.

Special safety notes
The following symbols are used in safety instructions to point out special risks:

DANGER!

This combination of symbol and signal word indicates an imminent dangerous situation caused by electrical power and/or electrical voltage. If a labeled hint like this is not observed this may result in serious or deadly injuries.

WARNING!

This sign draws the attention to parts of the operating instructions, where special care must be taken on account of heating of surfaces or on account of inductive heating of ferromagnetic material and where other special measures have to be taken.

2.2 Personnel Requirements

2.2.1 Qualification

WARNING!

Risk of injury due to insufficient qualification!
Improper use can result in serious injury to persons or property damage.
- All activities may only be performed by qualified personnel!

The following qualifications are listed in these operating instructions for different areas of operation:

- **Trained personnel/operators**
  Have been instructed in an instruction session by the operator with respect to the tasks assigned to them and the potential dangers arising from improper behavior.
- **Qualified specialists**
  Due to their specialized training, knowledge, and experience, as well as knowledge of applicable regulations, are capable of carrying out works assigned to them, while independently recognizing and avoiding possible risks.
- Only those persons are authorized as personnel who can be expected to perform their work reliably. People whose capacity for reaction is influenced e.g. by drugs, alcohol, or medications are not authorized.
- When selecting personnel, follow all age- and job-related guidelines applicable at the place of operation.
- Only those persons are authorized who know about special requirements when dealing with 20 kHz.

2.2.2 Unauthorized Personnel

WARNING!

Danger due to unauthorized personnel!
Unauthorized personnel who do not meet the requirements described here do not understand the dangers in the working area.
- Keep unauthorized personnel away from the working area.
- In case of doubt, address these persons and direct them away from the working area.
- Stop any works as long as unauthorized personnel is in the working area.

2.2.3 Instruction

Before commissioning the equipment, the personnel must be instructed by the operator. For better tracking, it is recommended to log the instruction, e.g. as follows:

Date	Name	Type of instruction	Instruction given by	Signature
05.11.2009	Heinz Mustermann	First instruction for personnel	Horst Müller	

Fig. 1: Example for an instruction report

2.3 Intended Use

The equipment is exclusively designed and built for the intended use described here.

WARNING!

Danger due to improper use!
Any application that deviates from or goes beyond the intended use of the devices can result in a hazardous situation.
Use the device only as intended.
- Strictly comply with all specifications in these operating instructions.

The following uses of the device are not permitted. Non-intended use particularly includes the following:
- Using the device with unapproved accessories or not authorized by the manufacturer.
- Operation of the device by untrained personnel.
- Operation of the device outdoors.
- Operation of the device when installed on an improper foundation/subsoil.

Claims of any kind due to damage from improper use are excluded. The operator is liable for all damage resulting from unintended use.

2.4 Protective Measures to be taken by the Operator/User

The equipment is used in the industrial sector. The operator of the device is thus subject to legal obligations for operational safety. In addition to the safety guidelines in these operating instructions, the safety, accident protection and environmental protection regulations applicable at the place of operation of the device must be followed as well. This particularly includes:

- The operator must be informed of applicable workplace safety guidelines and identify any additional hazards that result from the special working conditions at the site of operation of the device. These must be implemented in the form of operating instructions for the use of the device.
- The operator must verify during the entire operating time of the device, if the operating instructions provided still correspond to the current state of regulations, and adapt these instructions if necessary.
- The operator must clearly regulate and determine responsibilities for installation, operation, troubleshooting and maintenance.
- The operator must ensure that all employees involved with the device have read and understood these operating instructions. He must furthermore trained personnel at regular intervals and inform them about hazards.
- The operator must provide the personnel with all required safety gear.

Moreover it is within the responsibility of the operator, that the equipment is in perfect technical condition, this means:

- The operator must ensure that the maintenance intervals described in the mounting and operating instructions are observed.
- The operator must regularly check all safety devices for their operational capability and completeness.
- If a damage is detected, the operator must take the necessary measures immediately. If in doubt, the system must be shut down.

2.5 Specific Hazards

These operating instructions exclusively contain notes regarding the specified Track Supply. Please note all data and advice listed in this document. Ensure that the device is operated under the specified conditions only.

ADVICE!

Do not start up the device until you have made sure that the machine/system into which it has been integrated, complies with the applicable norms and directives!
We must point out that we will not accept any liability for damage and breakdown that have been caused due to not observing these operating instructions.

The following section lists residual risks that have been determined by a risk assessment.

- Follow the safety instructions listed here and the warnings in other sections of these mounting and operating instructions in order to reduce health hazards and avoid dangerous situations.

DANGER!

Electric shock and/or burns and other damage due to improper use!
The device is operated with high voltage and high currents.
- Do not open the device during operation.
- Do not remove covers.
- Do not insert any objects into the device.

The Track Supply has a weight of approx. 240 kg (variant with air conditioning approx. 300 kg) and must not be lifted or carried by a single person. It must be lifted or transported with appropriate auxiliaries. The relevant prescriptions must be observed, see chapter 5 „Technical Data“.

WARNING!

Risk of injury due to insufficient qualification!
Improper use can result in serious injury to persons or property damage.
- All works for installation and commissioning as well as for maintenance and disassembly must be carried out by qualified staff (observe IEC 364 resp. CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and the national accident prevention regulations).

ADVICE!

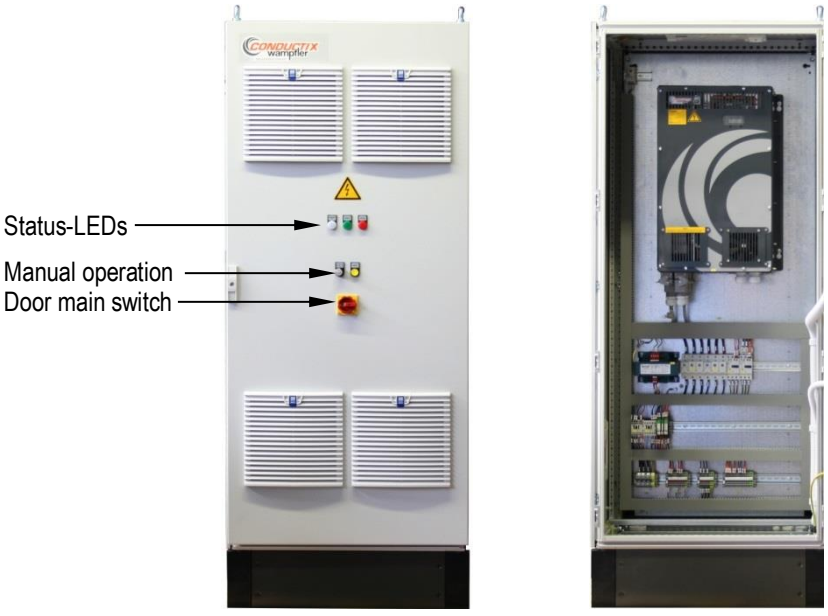
Qualified staff according to the safety regulations is persons that are familiar with the installation, assembly, commissioning and operation of energy supply systems and that have the appropriate qualifications.

3 Short Technical Description

The Track Supply serves for the energy supply of the secondary components within a defined area of the system. The Track Supply converts the supply voltage of 400 V/50 Hz or 480 V/60 Hz into a constant sinusoidal current of 20 kHz. The AC supply to the primary track of a system constitutes a local magnetic field where power is transmitted. In this way the galvanically isolated power transmission to the point of consumption (e.g. Pickups) will be possible. The optional variants described below are only suitable for specific configurations. Please consult Conductix-Wampfler.

4 Appearance

4.1 Standard Version – Forced Air Cooling



Existing variants:
91008-111-3130923 (80 A, 400 V)
91012-111-3130924 (125 A, 400 V)
91008-111-3130925 (80 A, 480 V)
91012-111-3130926 (125 A, 480 V)

Fig. 2: Variant air cooling – view with closed and with open door

ADVICE!

Please note that in some cases the above figure is not exactly in conformity with the supplied Track Supply (e.g. the color could be different or the cable connections could be at another place). If you are not sure that you have been delivered the right part, please contact a person at Conductix-Wampfler.

4.2 Track Supply IP54 (Air-Conditioned)

Device configurable via 91000-111-3130914

Fig. 3: Variant with air conditioning - view with closed and with open door

ADVICE!

Please note the advice regarding place of installation and separation distance in chapter 6.1 „Variant with Air Conditioning Unit (Side Mounting)“.

5 Technical Data

5.1 Electrical Power Data

■ Nominal power (cont.)	16 kW
■ Power reduction	-3% / °C to 50 °C with air cooling: from 35 °C on with air conditioning: from 40 °C on
■ Peak power	137 % (22 kW) for max. 1 minute / 10 minutes at 40 °C, with an average reduction of the load up to 13 kW
■ Output current	80 A or 125 A +/- 2 A @ 20 kHz +/- 50 Hz
■ Targeted load of line inductance[1]	58 µH +2 µH for 80 A Track Supply 26 µH +2 µH for 125 A Track Supply
■ Nominal output voltage range	560 - 665 V rms (80 A), 380 - 475 V rms (125 A) Overloading increases the voltage.
■ Output impedance to PE	180 Ω (center capacitive referenced)
■ Primary cable connection	M8 stainless steel screws for 35 mm² and 20 mm² HF stranded cable Max. connecting torque range 9-10 Nm

[1] Variants with integrated tuning units may also have different values. For information on settings, see chapter 6.2 of this document as well as the operation instruction BAL9100-0143. Settings of the inductivity are solely to be made by Conductix-Wampfler.

5.2 Electrical Input Values | Specifications for Versions with 400 V

■ Input voltage	400 V / 50 Hz, 3 phases symmetrically, with grounded neutral conductor
■ Supply voltage tolerance	-10 % to +10 %, with proportional power reduction for input voltages that deviate from the nominal value
■ Efficiency with nominal load	94 %
■ Power factor (cos ω)	0.89
■ Supply current	29 A with nominal output / voltage
■ Connection to terminals	M40 cable gland Maximum cable diameter is approx. 30 mm. (Use of flexible cables 4x16 mm² recommended.)
■ Internal leakage current	16 mA rms at standby. Occasionally pulse peak performance of 200 mA for 250 µsec with nominal load. If used, the earth connection equipment must have the respective nominal values.
■ Internal fuses	40 A protection of Track Supply 35 A equipment and wiring protection
■ Harmonic currents (nominal load)	5. -8.5 dB, 7. -18.7 dB, 11. -23.2 dB, 13. -32.6 dB (on fundamental)

5.3 Electrical Input Values | Specifications for Versions with 480 V

Input voltage	480 V / 60 Hz, 3 phases symmetrically, with grounded neutral conductor
Supply voltage tolerance	-10% to +10%, with proportional power reduction for input voltages that deviate from the nominal value
Efficiency with nominal load	94%
Power factor (cos ω)	0.89
Supply current	24 A with nominal output / voltage
Connection to terminals	M40 cable gland The cable outer diameter is 28 mm. (Use of a flexible cable 4x16 mm² recommended)
Internal leakage current	19 mA rms at standby. Occasional pulse peak power of 200 mA for 250 µsec at nominal load. If used, the earth connection equipment must have the respective nominal values.
Internal fuses	35 A protection of Track Supply 30 A equipment and wiring protection
Harmonic currents (nominal load)	5. -8.5 dB, 7. -17 dB, 11. -21.4 dB, 13. -28.4 dB (on foundation) (on fundamental)

5.4 Physical Data

5.4.1 Variant with Ventilation

Noise emission	during operation 65 dBA at 2 m distance from the device
Moving air volume	2 x 700 m³ / hours (air circulation)
Ventilator	2 axial ventilator
Protection class	IP54

5.4.2 Variant with Air-Conditioning

Ventilation/cooling	air conditioning unit type RITTAL TopTherm SK 3328.540
Ventilator	axial ventilator (internal air circulation)
Noise emission air conditioning unit	during operation 65 dBA at 2 m distance from the device
Protection class	IP54

5.5 Environmental Conditions

- Storage temperature: -20 °C to +60 °C
- Transport temperature -20 °C to +70 °C
- Ambient temperature + 5 °C to +35 °C (with ventilator) / + 5 °C to +50 °C (with air conditioning)
  Power reduction -3% / °C between 40 °C and 55 °C (At the inside!)

WARNING!

Damage due to extreme differences in temperature!
Frozen and very cold internal components might be the cause for damage of the device or its components at them moment of switch-on or with fast/strong loads.
If the storage temperature or ambient temperature is lower than the specified operating temperature, proceed as follows prior to commissioning the device:
- Store the device unloaded and switched-off for at least 12 hours with operating temperature.

WARNING!

Damage due to strong and frequent temperature changes!
Strong and immediate temperature changes will result in a reduction of the life time.
If the device is exposed to strong and frequent temperature changes during operation, the following measures must be taken:
- Demand-oriented heating/cooling of the device.
- Avoid condensation of the humidity.
- Avoid pumping effects due to temperature changes.

- Humidity < 90% non-condensing
- Ambient air No salt water, no conductive dry or humid dust! (e.g. carbon fibers)
  Extreme ambient conditions must be avoided (e.g. very dusty, oily and/or chemical influence)
- Power reduction at high altitudes 1% of the power/ 100 m over 1000 m, up to max. 3000 m above sea level
- IP protection class IP54 for air-conditioned variant (IP34 for external circuit air conditioning unit)
  IP54 for air cooled variant
- Degree of pollution PD = 2. Non-conducting pollution existing. This might temporarily become conducting, if humidity is present after switch-off.
- Maximum vibration 3 mm at 2 - 9 Hz, max. Acceleration 0.5 g at 9 - 200 Hz
- Maximum shock resistance 8 g, 11 ms
- Max. transport vibration 15 g, 11 ms packed / transport container

ADVICE!

The Track Supply requires sufficient air supply for a correct cooling. Ensure that the air supply is free at any time. The filters must be inspected for dust and oil clogging and be replaced if required.

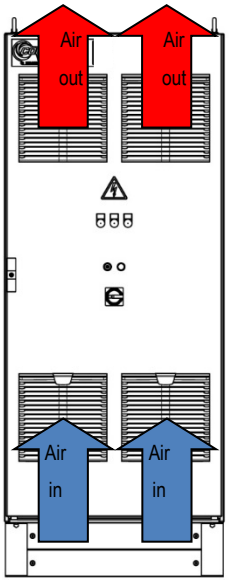


Fig. 4 Variant without air conditioning

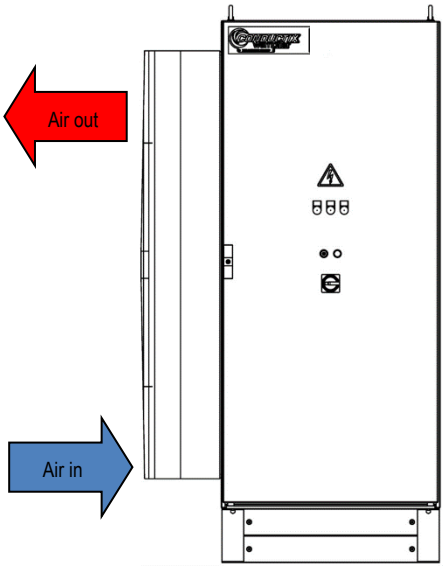


Fig. 5: Variant with air conditioning

Room around the housing: Sufficient air supply must be secured!

Recommended distances:

- 400 in front of the Track Supply with ventilator
- 100 mm behind the Track Supply
- 100 mm from the side of the Track Supply with ventilator
- 400 mm from the side of the Track Supply with air conditioning unit (at the side of the air conditioning unit)

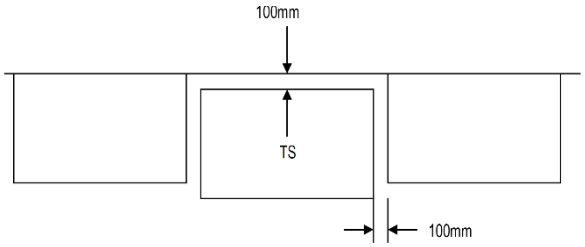


Fig. 1: Position Track Supply from the top (variant without air conditioning unit)

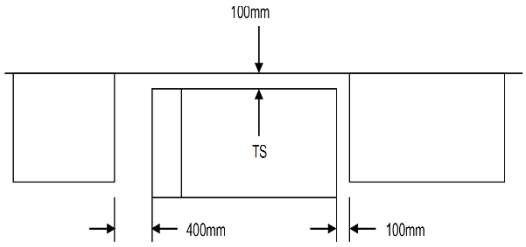


Fig. 2: Position Track Supply from the top (variant with air conditioning unit)

ADVICE!

The Track Supply must be fixed at the floor. Observe the specifications of the housing manufacturer.

ADVICE!

Screened cables are not obligatory. But they are recommended for the improvement EMC.
To avoid induced voltages at 20 kHz, you should avoid to install the control cables and other cables near the primary conductor and especially not more than 5 m along this one. Twisted two-wired lines help to reduce the capacitive coupling effect. The screening should be grounded on one side.

5.6 Mechanical Specifications

- Housing — Steel sheet housing RITTAL TS8 with door at the right
- Locking — Standard locking for RITTAL TS8-housing
- Door hinges — 130° opening angle
- Dimensions — See figure
- Housing color (outside) — RAL 7035 „light gray"
- Housing color (inside) — RAL 7035 „light gray"
- Housing color foundation — RAL 7022 „umbra-gray"
- Weight (with ventilation) — ~ 240 kg
- Weight (with air-conditioning) — ~ 300 kg

91008-111-3130923 (80 A, 400 V, …)
91012-111-3130924 (125 A, 400 V, …)
91008-111-3130925 (80 A, 480 V, …)
91012-111-3130926 (125 A, 480 V, …)

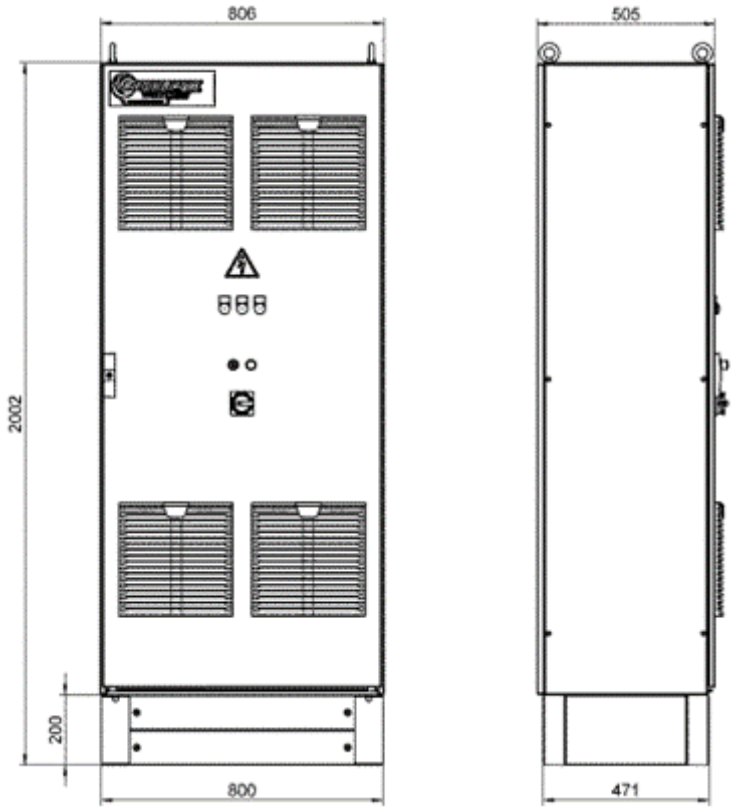


Fig. 6: Dimensions variant without air-conditioning

91000-111-3130914 (configurable version - with air-conditioning)

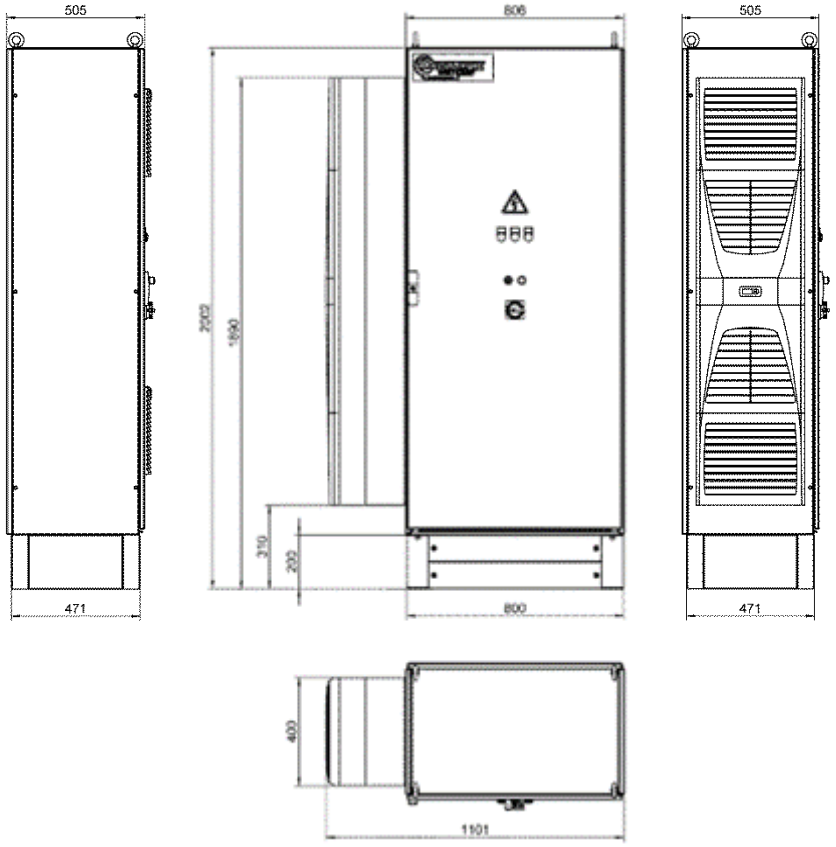


Fig. 7: Dimensions variant with air-conditioning

5.7 Connections | Track Supply IP54

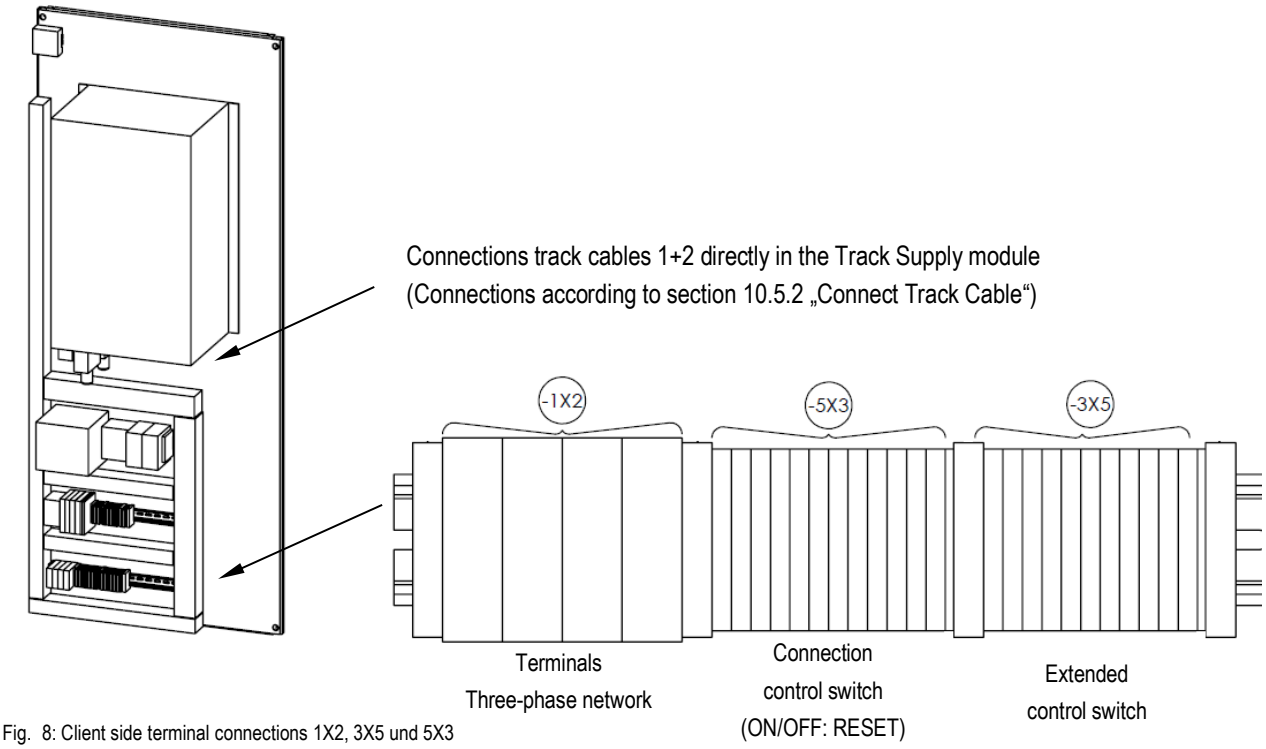


Fig. 8: Client side terminal connections 1X2, 3X5 und 5X3

Track outlet (screw connections X1) (direct to Track Supply Module)

PIN	Function	Comment:
1	Track cable 1	20 mm² (80 A) or 35 mm² (125 A)
2	Track cable 2	M8 cable lugs – only permitted when soldered

AC network (terminal 1X2)

No.	Function	Comment
1	Phase L1	Wiring protection provided by the customer: 63 A maximum
2	Phase L2	
3	Phase L3	
PE	Ground conductor	Connection to PE is required

Terminal 3X5: Only for commissioning

WARNING!

Risk of injury due to insufficient qualification!

Improper use can result in serious injury to persons or property damage.

- All activities may only be performed by qualified personnel!
- Only those persons are authorized who know about special requirements when dealing with 20 kHz.

Control and configuration (terminal 5X3)

No.	Function	Voltage / current	Comment
1	Start	24 V DC / 20 mA	+24 V 24 V present = Start
2			0 V
3	Reset	24 V DC / 20 mA	+24 V 0 V = Reset
4			0 V
5	Error message	230 V AC 24 V DC	Potential-free contact; typically closed, in case of dysfunction open
6			
7	free	-	
8			
9	Synchronization	±15 V	
10			

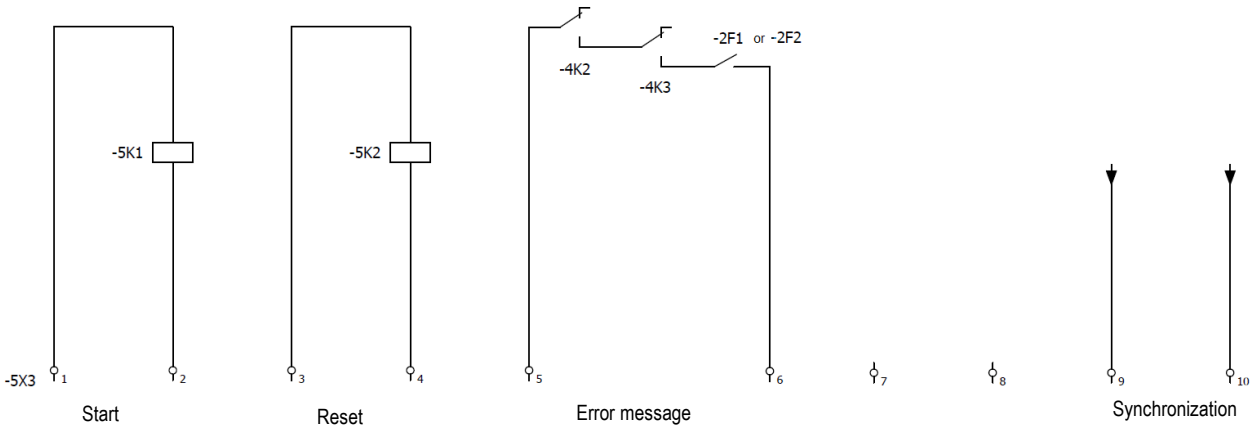


Fig. 9: Terminal assignment (schematic sketch)

ADVICE!

Terminal assignment see circuit diagram supplied. Make sure to include the additional instructions for installation listed there!

Further details, see chapter 10.5 „Electrical Connection“.

5.8 Design Standards

5.8.1 Design Standards for 400 V Versions

- EN 50178 Equipment of power plants with electronic equipment; German version EN 50178: 1997
- EN 61000-6-2 Electromagnetic compatibility (EMC) - part 6-2: General information Standards - interference resistance in the industrial sector
- EN 55011 Industrial, scientific and medical high frequency units (ISM-units) – radio interference Limit values and measurement process (IEC/ CISPR 11: 1997)

5.8.2 Additional Design Standards for 480 V Versions

- UL 508A Standards for industrial controls

5.9 Safety Features of the Track Supply Module

Overheating	Integrated temperature sensors and switches
Overloading	Output overload control
Overcurrent	Internal current monitoring
Overvoltage	Output voltage control
Grounding connection error monitoring	Trigger level monitored
Current sensor error detection	Recognizes if the sensor feed does not work properly.
Deviation on tuning	Monitoring of the tuning and recognition of a no longer correct installation
Phase loss	Recognizes if a phase of the power supply is missing
Power network isolation at the output	2500 V AC for1 min.
Fuses	Installed fuses

5.10 Grounding

The Track Supply must be grounded by qualified personnel at the place of installation and preferably to a three-phase network with grounded neutral point. Even if the Track Supply with supply systems with other type of grounding works, e.g. delta grounding works well, the electromagnetic compatibility and reliability can be negatively affected.
Metal structure, which is running close to or in parallel to the primary conductor over longer sections, must in any case be grounded by qualified personnel. To achieve the best possible results, multiply grounding will be required. To avoid induced voltages at 20 kHz, you should avoid to install the control cables and other cables near the primary conductor and especially not more than 4 m along this one. Twisted two-wired lines help to reduce the capacitive coupling effect. The screening should be grounded at one end.

5.11 ESD Protection

WARNING!

Electrostatically endangered components!
Electrostatic discharges (ESD) might damage electronic components.
- Comply with the respective ESD measures before and during the complete works at the open device, e.g. by means of a grounding bracelet.
- Connection to the ground must be assured any time. Details see EN 6100.

5.12 Illumination and Plug Socket | Track Supply IP54

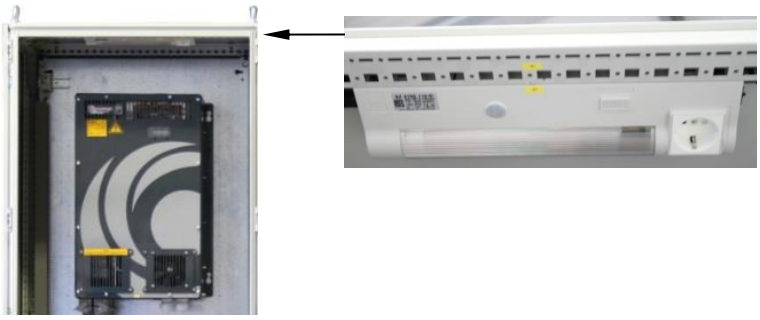


Fig. 10: Illumination unit with integrated plug socket

The installed illumination unit can be switched on and off via the integrated motion sensor or a switch.

ADVICE!

To conserve the illuminant we recommend to use the illumination only when carrying out works at the Track Supply IP54.

WARNING!

Danger of destruction/overloading due to improper utilization or too strong loads!
- The socket must only be used with appropriate plugs!
  CEE 7/7 Type E+F
  CEE 7/4 Type F
  CEE 7/6 Type C
  CEE 7/17 Type C
- The integrated electronical socket shall only be used for commissioning purposes!
- Please note, that the socket delivers 230 V, whether the mains connection is 400 V or 480 V.
- The load of the socket must not exceed 2 A. Devices with higher power requirements must not be operated at the integrated plug!

6 Options

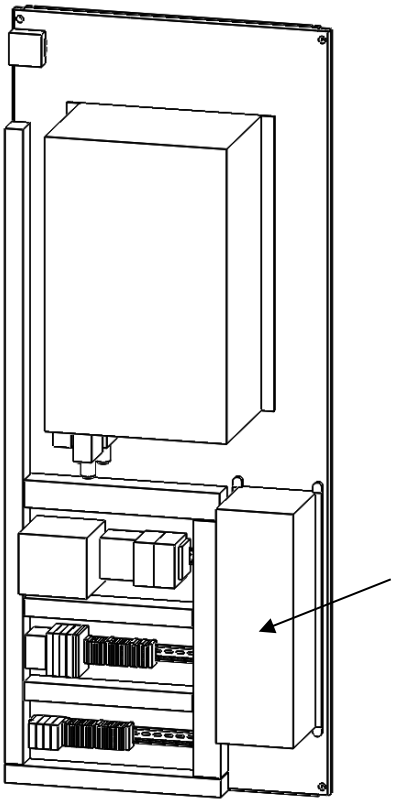
6.1 Variant with Air Conditioning Unit (Side Mounting)

The air conditioning is located at the left side of the Track Supply. During installation, ensure that there is enough space (min. 400 mm) to other cabinets and walls, to allow an unobstructed airflow (see chapter 4 “Appearance“ and chapter 5.5 „Environmental Conditions“). For more details regarding operation and maintenance of the air conditioning unit see the manufacturer’s (Rittal) documents. If there is a risk of heavy dirt in the environment and / or high temperatures, please select the variant with air conditioning unit. For the permitted ambient temperatures, depending on the version with fan and that with air conditioner, see chapter 5.5 “Environmental Conditions”.

ADVICE!

In case of a change, observe the connection of the air conditioning unit with the correct polarity according to the documentation of the manufacturer.

6.2 Integrated Tuning Unit (only in Combination with Air Conditioning Unit)



The device version with integrated tuning unit is meant for short tracks.
To adjust the inductivity, contact Conductix-Wampfler.
Consult BAL9100-0143 and apply it accordingly.

Fig. 3: View mounting plate

DANGER!

The tuning unit (without cover) is not safe to touch!
The integrated tuning unit is not safe to touch as long as the cover is not correctly installed. Work or modifications to the tuning units are reserved for Conductix-Wampfler personnel only. Make sure that the tuning unit is covered in such a way that nobody accidentally or intentionally touches live parts!

WARNING!

Overheating!
The cooling fins must be positioned vertically. An interconnection of the inductors being situated one above the other is not recommended due to local heating in case of insufficient air circulation.

The tuning units are already pre-assembled by the manufacturer. No changes may be made.
The configuration of the cables is to be performed by personnel of Conductix-Wampfler according to MV9100-0038. To adjust the inductivity, see BAL9100-0143 and consult Conductix-Wampfler.

The connections to the insulating supports are only intended for HF-Litz cables.

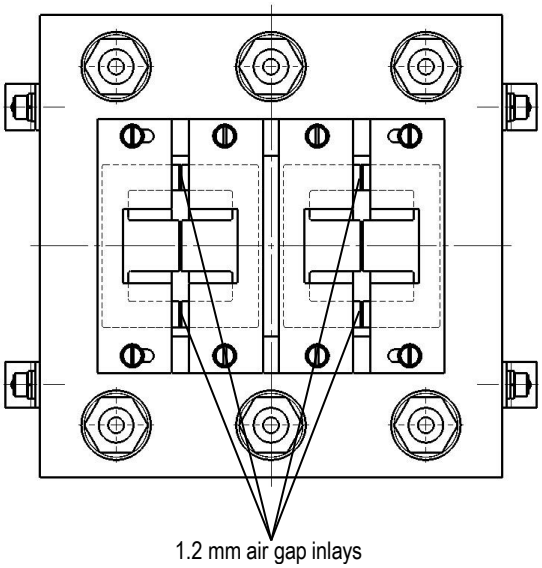


Fig. 4: Top view of an inductor with adjustable air gaps

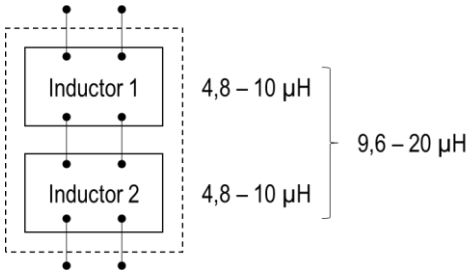


Fig. 5: Track Supply contains two inductors connected in series. The use of one single inductor is not provided for.

WARNING!

Risk of fire!
1.2 mm air gap inlays (glued in) are part of the scope of delivery of an inductor. These may not be removed neither for the 80 A version nor for the 125 A version, otherwise there is a risk of fire. Make sure that there are no metallic parts (not even stainless steel) in the air gaps. For the 125 A version additional 0.8 air gap inlays (included in the scope of delivery) must be used to make sure that the ferrite cores are parallel (mechanically).
Configurations must be performed by qualified staff from Conductix-Wampfler.

7 Track Supply Module

(1) Main air outlet

(2) Air outlets

(3) Access to the primary conductor

(4) Mains and control connections

(5) Access to the fuses

(6) display status-LEDs

7.1 Indicator Circuit Board of the Track Supply

The indicator circuit board of the Track Supply is made up of a 3 x 16 sign display with background lighting, three LEDs and two buttons for operation.

(1) 3 x 16 sign display
(2) 'Mode'-button
(3) 'Set'-button
(4) LED's

7.2 LED-Display

The three LED of the indicator circuit board show the following states:

Green LED	Meaning	Cause
○ Off	Track Supply without power supply or error →see red LED	Possible causes: ■ Track Supply not connected to power supply ■ Problem control board
☼ Flashing	Track Supply in standby mode	Normal state at missing START signal on HAN-10E
● On	Track Supply works	Normal state: The signals for START and reset are available at the HAN-10E

Red LED	Meaning	Cause
○ Off	Track Supply without power supply or without error → see green LED	Normal state, if no error existing.
☼ Flashing	Track Supply in reset mode	Normal state due to the not existing signal for reset on HAN-10E
● On	Error Track Supply → see yellow LED / LCD	See error code on display. Error codes are described in chapter 7.7.

The yellow LED warns the operating personnel of critical operational states. Such warning messages do not stop the Track Supply. If, however, a warning is not noticed, this can cause an error. If more than one warning messages are existing, only the most important one will be displayed (in the following table the events are arranged from top to bottom with increasing importance. Example: If there are both warning for tuning and overloading, the overload warning LED will be switched on. In any case the LCD indicates both warnings, see chapter 7.6.

Yellow LED	Meaning	Cause
○ Off	No warnings	
☼ 1 short flashing every 2 seconds	Real-time warning	The real-time clock stopped due to a too weak battery and might indicate wrong data. But the Track Supply continues to operate. However, errors will no longer be displayed with the correct date.
☼ 2 times short flashing every 2 seconds	Tuning warning	Track inductance too low or too high. The Track Supply can continue to operate, but excess temperature may occur. Causes: ■ Wrong commissioning ■ Pickups added after commissioning ■ Damaged track tuning capacitors ■ Track/Feeds repositioned or lengthened
☼ Slow flashing	Excess temperature warning	One or several of the following causes: ■ Air supply or air removal blocked ■ Ventilator(s) blocked or defective due to dust ■ Heat sink blocked due to dust ■ Overload due to high loads ■ Ambient temperature is too high The Track Supply can continue to operate, but an excess temperature error may occur.
● On	Overload warning	Too many consumers on the system/in the feeding section. The Track Supply will continue to operate, but an excess temperature, excess current or excess voltage may occur.

7.3 Version Number of the Software

After switching on the LCD-display a start indication will be displayed for 5 seconds with the serial number of the software version, the compile time and the compile date.
The Track Supply can start its function prior to the expiration of these 5 seconds. This depends on the START input.

```
Version 1234567a
13:07
May 17, 09
```

7.4 Modes of Operation

During operation the LCD shows some basic information to the operating mode of the Track Supply. The following operating modii have been defined:

The Track Supply is supplied with voltage, but there is no correct signal at the reset input. Output is deactivated.

```
-----RESET-----

No warnings
```

The Track Supply is supplied with voltage, but there is no correct signal at the START input. Output is deactivated.

```
----STANDBY----

No warnings
```

The Track Supply works normally.

```
----OPERATION---

No warnings
```

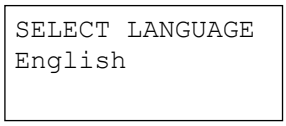
The Track Supply has recognized an error. The error code is displayed together with date and time of its appearance.
Regarding error code see chapter 7.7. Output is deactivated.

```
-----ERROR-----
E001        15:01
          26.05.09
```

7.5 Language Setting, Time and Date

Below the LCD you will find two buttons, by which the operating personnel can change the basic settings. These settings can be made in each operational state, except in the RESET mode. If the RESET mode is selected (no signal at RESET) while modifications are being made, these will get lost.

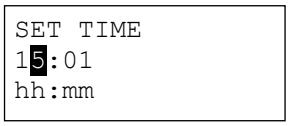
To change setting, press the button MODE for 5 seconds. When this time has expired the display looks like in the figure at the right. With each pressing on the SET button another one of the four languages will be displayed:



- English
- German
- French
- Italian

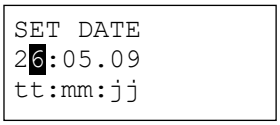
By pressing the MODE button you will get to the next setting, as illustrated below.

The time setting will be displayed in a 24-hours format hh:mm. The buttons have the following functions:



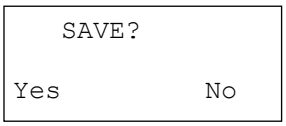
- Pressing and holding the SET-button steps up the setting that is marked by the cursor.
- Pressing the MODE-button puts the cursor on the minutes setting or the date setting.

The date is appears in formati tt.mm.jj. The buttons have the following functions:

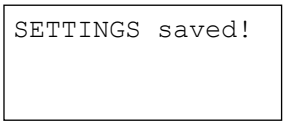


- Pressing and holding the SET-button steps up the setting that is marked by the cursor.
- Pressing the MODE-button puts the cursor to the next setting or the next page to set.

If changes have to be made, the user is asked for his confirmation or cancellation of those.



- Pressing the MODE-button will cancel the changes.



- Pressing the SET-button will store the new settings, which is confirmed by the display as shown on the right side.

7.6 Warning Messages

While staying in the operational mode RESET, STANDBY and OPERATION, additional warning messages can be displayed. These are indicated by the state of the yellow LEDs. If there is more than one warning at the same time, these will be indicated one after the other at secondary frequency. The following warning messages can occur:

- No warnings
- Warning tuning
- Warning temperature
- Warning overload
- Warning time of the day

Regarding a detailed description and possible reasons, see chapter 7.2 „LED-Display“.

7.7 Error Codes

WARNING!

Danger of injury due to improper fault elimination!
Improper fault elimination can result in serious injury or property damage.
- Contact the manufacturer in case of malfunction.
- Allow fault elimination to be carried out only by personnel from or authorized by the manufacturer.

Please note that one and the same problem can result in different error codes, depending on when it appears. This happens because the error monitoring methods and response times are different for each type of error, as well as the sequential processing on the part of the microprocessor. If an error has been recognized the subsequent errors will be ignored and not displayed.

Error code	Description	Meaning/cause
E001	Phase loss	■ Input line phase missing or weak ■ Fuse(s) triggered ■ Fuse mounting is not closed or is not properly screwed
E002	IGBT-error	■ IGBT or IGBT-driver defective ■ EMC-interruption
E003	Internal current limiting activated	■ High peak load ■ Track cable is interrupted or not connected ■ Track tuning faulty
E004	Earth fault	■ Isolation of the Track Supply or the track cable is damaged ■ Water on the track ■ Ground current error level set too low
E005	Door open	■ Pin 11 and 12 of X104 are not bridged ■ Loose connection
E006	No track current	■ Track current sensor or connection cable defective
E007	High temperature at sensor 1	■ Air supply or air removal blocked ■ Overload due to high loads ■ Ambient temperature too high

Error code	Description	Meaning/cause
		■ Tuning condensers damaged ■ Axial fan defective / fan fuse triggered
E008	High temperature at sensor 2	■ See E007 ■ Fan of tuning unit defective ■ HF Litz cable is loose
E009	Temperature sensor 1 defective	■ Sensor defective ■ Loose connection
E010	Temperature sensor 2 defective	■ Sensor defective ■ Loose connection
E011	High temperature at sensor 1 cooling body	See E007
E012	High temperature at sensor 2 cooling body	See E007
E013	Temperature sensor 1 at cooling body has a short circuit	■ Connection problem of the temperature sensor
E014	Connection to temperature sensor 1 on cooling body interrupted	■ Connection problem of the temperature sensor
E015	Temperature sensor 2 at cooling body has a short circuit	■ Connection problem of the temperature sensor
E016	Connection to temperature sensor 2 on cooling body interrupted	■ Connection problem of the temperature sensor
E017	Temperature switch 1 interrupted	■ Loose connection ■ See E007
E018	Temperature switch 2 interrupted	■ Loose connection ■ See E007
E019	LCD	■ LCD defective ■ Loose connection between display and control board
E020	Output voltage (track) high	■ Track tuning faulty
E021	Output voltage (track) high	■ Error control board
E022	Output power too high	■ To many consumers on track or too high power demand
E023	Soft start error	■ Soft start circuit error
E024	Watchdog	■ Software problem
E025	Voltage drop	■ Voltage error at supply control board ■ Power supply error at the control board
E026	Output track supply interrupted	■ Track cable is not connected ■ Track cable is damaged or interrupted
E027	Intermediate circuit voltage high	■ Mains overvoltage e.g. flash or other disturbance ■ Secondary Pickup load suddenly removed
E028	Intermediate circuit voltage low	■ Phase of the power supply missing, e.g. fuse not triggered ■ Low power supply
E029	Software limit internal current	■ High peak load ■ Track cable is interrupted ■ Track tuning faulty

Error code	Description	Meaning/cause
E030	Intermediate circuit voltage instable	■ When switching on the device it was not possible to read out a stable voltage on the intermediate circuit due to a power supply disturbance
E031	High inductivity	■ Track tuning condenser aging, error or loose connections ■ Faulty commissioning ■ After commissioning pickups have been added ■ Track cable / feed line has been modified or extended after commissioning
E032	Inductance low	■ Track tuning condenser aging, error or loose connections ■ Faulty commissioning ■ After commissioning pickups have been added ■ Track cable / feed line has been modified or extended after commissioning
E033	Error of the 3.3 V power supply	■ Communications power supply overload/error
E034	Error of the 3.3 V power supply	■ Micro power supply overload/error
E035	Error of the 3.3 V power supply	■ Analogous power supply overload/error
E036	Error of the 3.3 V power supply	■ FPGA current supply overload/error
E037	Error of the 5 V power supply	■ 5 V power supply overload/error
E038	Error 24 V control board supply	■ 24 V power supply overload/error ■ 24 V on HAN 10 is used externally in an improper way
E039	FPGA configuration error	■ FPGA error ■ Flash memory error ■ SPI bus problem
E040	FPGA SPI bus error	■ SPI bus problem
E041	Invalid measurement of the output voltage	■ FPGA error
E042	Invalid measurement of the output current	■ FPGA error
E043	Invalid measurement of the internal current	■ FPGA error
E044	Oscillator error	■ Error of the micro-oscillator
E045	FPGA software error	■ Software incompatible
E046	Zone controller 1 error	■ Error message of external zone controller
E047	Zone controller 2 error	■ Error message of external zone controller
E048	DIP switch	■ Incorrect DIP switch position
E049	Output peak power high	■ See E022; too many consumers on track or too high power demand

8 Fuses

8.1 Semiconductor Main Fuses | Track Supply Module

DANGER!

Danger of electric shock!
The Track Supply is de-energized only if the voltage supply has been interrupted for at least 20 minutes by switching off or unplugging the power plug.
- Wait at least 10 minutes after switch-off, so that voltages of the intermediate circuit condensers can fall down to < 60 V DC.

For control and replacement of the main fuses observe the following:
- Remove the Track Supply from the power supply voltage and protect it from a restart or resetting.
- **Before** you open the Track Supply wait at least 10 minutes so that the internal discharge can fall down to < 60 V DC.
- Remove the safety cover (left cover)
- Then check the condition of the fuses.

ADVICE!

If one of the fuses must be replaced, please always replace all three fuses together! Only use the prescribed fuses. See chapter 21 „Spare Parts“.

- Ensure that the fuses are properly seated and receptacle is fully closed.
- Replace the cover into its position and restart the operation of the Track Supply.
- Connect the Track Supply to the mains supply and switch it on again.

8.2 Other Protective Devices (Fuses)

The Track Supply is equipped with several automatic fuses and protective switches. These must only be replaced after having consulted Conductix-Wampfler. In the event of the repair the Track Supply must be disconnected from the mains supply and an appropriate time must be considered for discharging processes (approx. 10 minutes to let the voltage drop to < 60 V DC).

ADVICE!

A reset of the automatic fuses is not permissible, as long as the Track Supply is connected to the mains supply!

ADVICE!

Only use the prescribed fuses. See chapter 21 „Spare Parts“.

9 Transport, Packaging and Storage

9.1 Transport

9.1.1 Safety Instructions for Transport

CAUTION!

Damage from improper transport!

Improper transport can result in substantial property damage.

- Proceed with care when unloading packaged parts upon delivery or during internal transport, and observe the symbols and notes on the packaging.
- Only move, lift and transport the track supply with appropriate lifting and transport equipment (weight see chapter 5.6 „Mechanical Specifications“).
- When using a forklift or similar transport device, ensure that the housing will not be damaged.
- Only remove packaging material immediately prior to starting the installation.

9.1.2 Transport Inspection

Check the shipment for completeness and transport damage immediately upon receipt.
If transport damage is externally visible, proceed as follows:

- Do not accept the shipment, or accept it only with reservations.
- Note the scope of damage on the transport documents or on the transporter's delivery note.
- Initiate a complaint.

ADVICE!

Claim every defect as soon as it is detected. Damage compensation claims may only be made within the applicable claim periods.

9.2 Packaging

The individual packages have been packed according to the expected transport conditions. We have used environmentally sound packing material only.

The packing shall protect the individual components up to the assembly from transport damage, corrosion and other kind of damage. This is the reason why the packing material should not be destroyed and only be removed immediately before starting with the assembly.

Handling of packaging materials:
Dispose of packaging material according to the valid legal regulations and local guidelines.

CAUTION!

Environmental damage due to improper disposal!
Packaging material is a valuable resource and can be reused, processed or recycled in many cases.
- Dispose of packaging materials in an environmentally appropriate manner.
- Observe the locally applicable disposal guidelines; if necessary, engage a specialist for disposal.

9.3 Storage of Packages

Store packages under the following conditions:

- Do not store outdoors.
- Store in a dry and dust-free place.
- Do not expose to aggressive media.
- Protect from direct sunlight.
- Avoid mechanical vibrations.
- Storage temperature: -20°C to +60°C
- Humidity: < 90% non-condensing
- When storing for more than 3 months, check the general condition of all parts and the packaging at regular intervals. If necessary renew or replace the preservative.

ADVICE!

In case goods are delivered with specific storage instructions or specific hints on the package, those must be observed. They may overrule the above requirements if they are more demanding than the above requirements.

10 Installation

10.1 Who is allowed to do the Installation?

WARNING!

Risk of injury due to insufficient qualification!
Improper use can result in serious injury to persons or property damage.
- All works for installation and commissioning as well as for maintenance and disassembly must be carried out by qualified staff (observe IEC 364 resp. CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and the national accident prevention regulations).
- All works for installation und commissioning must be carried out according to these operating instructions. Any notes listed in this document must be strictly observed. It is moreover required to observe the general national prescriptions and specific factory regulations.

ADVICE!

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

Settings of the inductivity are solely to be made by Conductix-Wampfler.

10.2 General Installation Recommendations

- After having received the component(s) and prior to starting the installation works unpack the components and check exactly for any damage, which may have occurred due to transport or storage (damage at the housings and isolation, missing parts etc.).
- Check the data on the identification plate to make sure that the components fulfill the requirements regarding nominal power and voltage.
- Ensure and verify completeness of the documents, if the documents comply with the supplied component(s).
- If several Track Supplies are applied in one single system, it may be possible that they must be synchronized. Conductix-Wampfler provides the documentation with the synchronization components.
- Prior to the installation ensure that the Track Supply is securely placed on a plane subsoil. The Track Supply must be fixed on site so that it will have a safe position under all circumstances.
  The balance point of the Track Supply is in the center. Observe the instructions of the housing manufacturer to fix the housing at the floor! For the fixation use components recommended by the manufacturer.
- For the installation of the Track Supply ensure that it is mounted safely and firmly. It must be fixed on site so that a safe position of the Track Supply will always be ensured.

ADVICE!

Wrong installation of the current supply has some negative effects on function, efficiency and lifetime. It is therefore important to observe the specification regarding the determination of the installation site. If this is not observed the warranty will expire!

10.3 Place and Conditions of Installation

Install the Track Supply in a dry and ventilated space. The Track Supply must be installed in a vertical position and mounted onto a solid subsoil or to a solid wall.

The waste heat of the Track Supply will be dissipated by ventilators via outlet openings in the housing or via the laterally installed air conditioning unit. Therefore absolutely ensure during the assembly that the air flow at the intake and outlet opening will not be hindered – see chapter 6.1 „Variant with Air Conditioning Unit (Side Mounting)“.

The ambient temperature should not be below 5°C and must not exceed the Conductix-Wampfler specification of 35 °C at a ventilator or 50 °C at an air conditioning unit. The relative humidity should be below 90 % and there must not be any condensation. Any negative ambient conditions must be avoided.
Any application beyond these conditions may result in changes of the performance parameters. For further information, see chapter 5 „Technical Data“.

The climatic conditions for the storage and operation must be observed according to the specifications, see chapter 5.5 “Environmental Conditions“.

The recommended distances from the Track Supply or air conditioning to adjacent devices and walls must be observed for maximum performance, especially if adjacent appliances also produce heat. See Fig. 1: Position Track Supply from the top (variant without air conditioning unit) and Fig. 2: Position Track Supply from the top (variant with air conditioning unit).

10.4 Electrical Regulations

The applicable general electrical working conditions, i.e. VDE 0100 (installation and operation of equipment up to 1000 V), must be observed.
The fuses in the Track Supply serve for damage limitation in the Track Supply, if components are faulty. The feed line from the power connection to the Track Supply must be protected properly according to the local regulations.

10.5 Electrical Connection

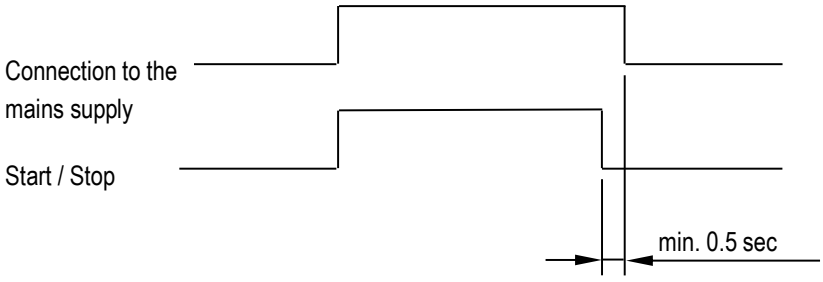
10.5.1 Power Connection

The electric cables for the supply lines L1, L2, L3 and PE must be chosen as follows:

1. Use connecting cables that have been approved according to VDE, UL and CUL, according to the local requirements.
2. The Track Supply has been designed for connection to a neutrally grounded 3-phase supply system. Although it is possible to use alternative supply system, such as delta grounding, we do not recommend those, since those could lead to the expiration of the warranty. If you should have any doubts about that, please contact Conductix-Wampfler.
3. The nominal voltage of the cables for systems with 480 V AC must be at least 600 V.
4. The core cross section must be planned according to the respective standards, however we recommend minimum as described in the chapter 5 “Technical Data”.
5. The grounding must be made according to VDE, NEC and IEC, see chapter 5.10 „Grounding“.
6. The 3-phase supply connection to 1X2 requires a flexible cable for the connection. The maximum outside diameter for the cable is approx. 30 mm with the accompanying M40 cable gland.

ADVICE!

To avoid damage of the input fuses Conductix-Wampfler recommends to remove the 3-phase power connection only if the START/STOP-signal is in the position “STOP”. A delay of at least 0.5 seconds is recommended!



10.5.2 Connect Track Cable

ADVICE!

Connection of the Track Cable with the Option Integrated Tuning Unit
With the option integrated tuning unit, the track cable is connected directly to the tuning unit and not as described in this chapter 10.5.2. For a detailed description see chapter 10.5.3.

Introduce the track cables through the cable glands into the Track Supply and fix it to the side wall by means of plastic clamps.

ADVICE!

Both cables should be bundles together as close as possible. This also applies for the distance from the side wall to the Track Supply module.

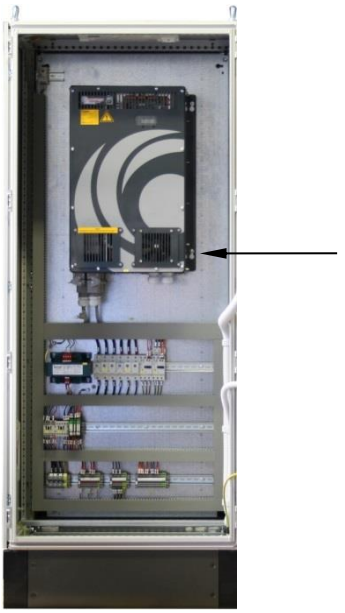
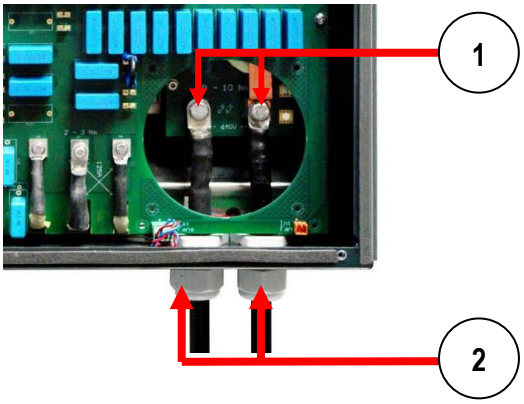


Fig. 11: : Cable guide track cable

Torque for the track cable connections X1.1 and X1.2: 9 – 10 Nm.



(1) Connection terminals Track cable (X1.1 und X1.2)

(2) Cable outlets

Fig. 12: Connection track cable

Fig. 13: Connection track cable (with unmounted cover plate)

Example figure (right): Cable connection through the opening on the right side. For the fixation of the stainless steel M8 screws use a torque von 9 to 10 Nm. Fuses are behind the left hand cover.

DANGER!

Danger of electric shock!
The Track Supply is de-energized when the switch on the door is in positon OFF or if the plug is disconnected, but only if the power supply is disconnected for more than 20 minutes.
- Prior to opening the Track Supply wait at least 20 minutes!
- Observe the safety regulation and ensure that nobody else has access to the open Track Supply.

10.5.3 Connection of the Track Cable with the Option Integrated Tuning Unit

Introduce the track cables through the cable glands into the Track Supply and then through the cable glands of the Tuning Unit.

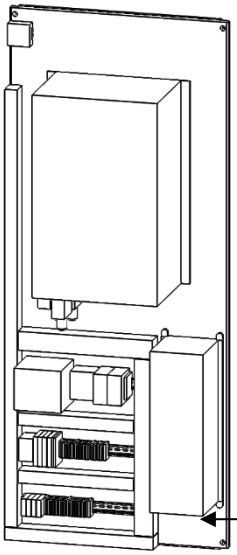
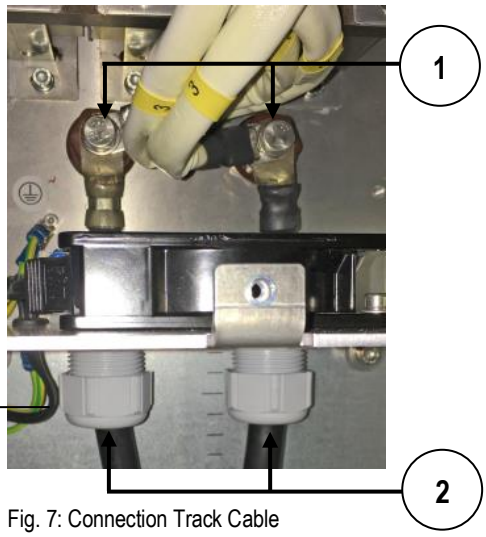


Fig. 6: Cable routing Track cable



(1) Connection terminal Track cable

(2) Cable outlets

Torque cable connections:
9 - 10 Nm.

Fig. 7: Connection Track Cable

Example figure above: Cable connection of the Tuning Unit (without cover). For the fixation of the stainless steel M8 screws use a torque of 9 to 10 Nm.

DANGER!

Danger of electric shock!
The Track Supply is de-energized when the switch on the door is in positon OFF or if the plug is disconnected, but only if the power supply is disconnected for more than 20 minutes.
- Prior to opening the Track Supply – done by qualified personnel – wait at least 20 minutes!
- Observe the safety regulations and ensure that nobody else has access to the open Track Supply.

WARNING!

Overheating due to magnetic stray field!
The cables are to be laid out in pairs in order to minimize the magnetic stray field. This applies especially to incoming and outgoing cables.

WARNING!

Hot surfaces!
The connections on the insulators are only for HF-Litz cables. Do only use stainless steel screws.

WARNING!

Risk of injury due to improper mounting and initial commissioning!
Connections may only be installed by qualified personnel from Conductix-Wampfler. All covers are to be kept closed.

ADVICE!

Bundled installation of the connection cables
Cables are to be laid out together before and as soon as possible after the tuning unit and are to be bundled.

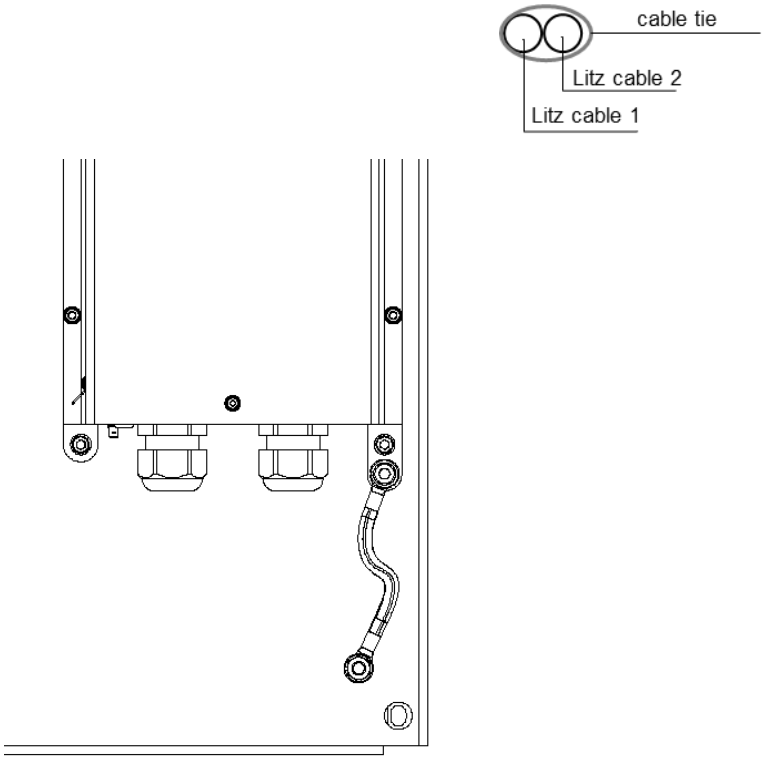


Fig. 8: Connection of the Tuning Unit with a grounding cable to the mounting plate

DANGER!

Danger of electric shock!
The housing of the Tuning Unit must always be connected to the mounting plate via a grounding cable.

11 Warnings and Precautions

DANGER!

Danger of life due to electric shock!
Although the Track Supply is isolated from the mains supply by a transformer, the output with ground conductor is equipped with Y-connected noise suppressing condensers. This means a potential voltage exists with respect to the PE that might cause electric shock and even death.
- Do not touch uninsulated parts of the mains supply!
- Do not touch any electrical components of the Track Supply power supply!
- Observe safety precautions before and after covers and housing have been removed.
- Avoid risk of life by appropriate safety measures!

DANGER!

Danger due to improper use!
The Track Supply is only intended for operation in connection with other, accordingly dimensions components.
- If you are not sure that this is the case, contact Conductix-Wampfler. Do not start operation of the Track Supply/system in this case!

WARNING!

Interference of the operation by intrusion of dirt and dust!
Operation of the Track Supply without its covers may allow the intrusion of dirt and dust, thereby reducing the functioning and reliability according to the specification.
- Avoid operation with removed covers and/or open cover.
- Tighten cable glands at the lower end in the housing and ensure that the covers are screwed properly. All cable connections in the housing must be fixed.

WARNING!

Risk of injury due to insufficient qualification!
Improper use can result in serious injury to persons or property damage.
- All works for installation and commissioning as well as for maintenance and disassembly must be carried out by qualified staff (observe IEC 364 resp. CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and the national accident prevention regulations).
- All works for installation und commissioning must be carried out according to these mounting instructions. Any notes listed in this document must be strictly observed. It is moreover required to observe the general national prescriptions and specific factory regulations.

ADVICE!

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

12 Commissioning

12.1 Safety

Track Supplies have to be commissioned in connection with the respective components of the rail systems. For commissioning it is necessary to mount the secondary components (Pickups and Regulators) on all vehicles. Access to secondary Pickups and Regulators on all vehicles is necessary.
The primary system has to be installed completely before commissioning Track Supplies. Commissioning on site requires the correct adjustment of the primary track cable impedance where the Track Supply is connected to. For the general operation of the inductive energy supply system the local conditions will be considered and optimum resonance conditions for the system will be provided with the help of condensers and coils. These adjustments at the Track Supply must be only be made by trained personnel.

WARNING!

Danger due to unauthorized personnel!
Unauthorized personnel who do not meet the requirements described here do not understand the dangers in the working area.
- Keep unauthorized personnel away from the working area.
- Identify dangerous areas by warning signs and secure those with a barrier tape from access by unauthorized persons are from contact with current-carrying components.
- In case of doubt, address these persons and direct them away from the working area.
- Stop any works as long as unauthorized personnel is in the working area.

For the implementation of the commissioning the following requirements must be fulfilled:

- Free access to the site.
- Free access to the voltage supply.
- Free access to all components.
- All safety-relevant covers must always be closed, unless work is being carried out in the corresponding area.
- Safe storage of the equipment required for commissioning (components, tools, auxiliaries etc.).
- Possibility to remove or to short-cut Pickups.
- Possibility to add load to the Pickups / power regulators step by step.
- Access to the external control signals to the Track Supply.

DANGER!

Danger of electric shock!
No adjustments or work (including maintenance) must be made to the Track Supply while voltage is applied.

ADVICE!

Any changes to the system (e.g. more vehicles) or in the environment after commissioning requires additional commissioning.

12.2 System Conditions

The permissible transient fluctuation of the system voltage is between -10% and +10% of the nominal voltage. If the values are lower or higher than these, the technical data of the Track Supply cannot be guaranteed any longer and destruction of some components may be the consequence.

12.3 System Protection

The system operator must install fuses or overload switches in the area of the power input according to the relevant regulations of the NEC and all local regulations. The operation level must be coordinated with the internal fusing and the expected load.

13 Start and Operation

The Track Supply is not designed for independent operation. It has to be operated in connection with other corresponding rail components. Therefore no specific details about the operation are given in this document. Prior to switching-on the Track Supply ensure that the installation and commissioning have been implemented properly. Always observe the valid safety regulations!

DANGER!

Danger of life due to electric shock!
After having connected the Track Supply to the line voltage the components of the power circuit are connected to the voltage network as well.
- Never touch these components!
- Keep all doors and covers closed.

WARNING!

Danger of injury due to improper operation!
Improper operation can result in serious injury to persons or property damage.
- Carry out all operating steps according to the specifications of these operating instructions.
- Before starting work, ensure that all covers and safety systems are installed and are working properly.
- Never put safety systems out of order during operation.

WARNING!

Danger for unauthorized personnel!
Unauthorized personnel who do not meet the requirements described here do not understand the dangers in the working area.
- Keep unauthorized personnel away from the working area.
- In case of doubt, address these persons and direct them away from the working area.
- Stop any works as long as unauthorized personnel are in the working area.

Start sequence:

1. Ensure that “OFF” is set as an external START signal.
2. If an external switch has been installed between the main distribution and Track Supply switch it on now.
3. Put key switch on AUTO
4. Switch on the Track Supply by switching the START-input to “ON”.
   → LED “switching” must be flashing now on the control board.
5. The system is now ready for operation.

ADVICE!

Prior to any intervention into an electrical or mechanical component of the energy supply system, always disconnect the complete system always from the supply voltage! Connecting and disconnecting measuring instruments is only permitted under off-circuit conditions and must only be carried out by trained personnel.

ADVICE!

Reconstruction or modifications at the energy supply system or its components on one’s own authority are excluded from the guarantee. Any necessary reconstructions or modifications - especially on electrical components - are only permitted if approved by Conductix-Wampfler.

14 Switch Off

As already described in chapter 10.5 „Electrical Connection” the Track Supply shall always be switched off via the external START-input “OFF” prior to disconnecting the supply voltage (i.e. by a load disconnector).

DANGER!

Danger of electric shock!
The Track Supply is de-energized only if the voltage supply has been interrupted for at least 20 minutes by switching off or unplugging the power plug.

- After having disconnected the energy supply system from the supply voltage, do not touch any components of the power connections.
- Wait at least 10 minutes after switch-off before starting any works at the energy supply system or its component, so that voltages of the intermediate circuit condensers can fall down to < 60 V DC.

ADVICE!

The lifetime of the components can be extended by switching off the Track Supply when the system is not required, e.g. during the night or on weekends.

15 Manual Operation

For commissioning, tests or if an external control for the release of the Track Supply is not available, a manual start release is possible.

DANGER!

Danger of life due to electric shock!
After having connected the Track Supply to the line voltage the components of the power circuit are connected to the voltage network as well.
- Never touch these components!
- Keep all doors and covers closed.

WARNING!

Danger of injury due to improper operation!
Improper operation can result in serious injury to persons or property damage.
- Carry out all operating steps according to these operating instructions.
- Before starting work, ensure that all covers and safety systems are installed and are working properly.
- Never put safety systems out of order during operation.

WARNING!

Danger for unauthorized personnel!
Unauthorized personnel who do not meet the requirements described here do not understand the dangers in the working area.
- Keep unauthorized personnel away from the working area.
- In case of doubt, address these persons and direct them away from the working area.
- Stop any works as long as unauthorized personnel are in the working area.

Start sequence:

1. Ensure that “OFF” is set as an external START signal.
2. If an external switch has been installed between the main distribution and Track Supply switch it on now.
3. Switch on the Track Supply by setting the key switch to ON.
   → LED “switching” must be flashing now on the control board.
4. The system is now ready for operation.
5. Errors can be quit by activating the RESET button

16 Emergency Measures

DANGER!

Danger of electric shock!
The Track Supply is de-energized only if the voltage supply has been interrupted for at least 20 minutes by switching off or unplugging the power plug.
- Wait at least 10 minutes after switch-off before starting any works at the energy supply system or its component, so that voltages of the intermediate circuit condensers can fall down to < 60 V DC.

WARNING!

Risk of personal injury of property damage!
Whenever safe operation cannot be ensured, the system must be shut down and secured against restarting. In the event of smoke or sparks in the housing or danger of personal injury or property damage, immediately disconnect the Track Supply from the power supply.
- Set the main switch at the door to “OFF”.
- Pull power plug HAN-6HSB.

ADVICE!

Unauthorized switching on by a third person has to be prevented by removing the line fuses of the mains supply or by other adequate measures on site.

ADVICE!

The dangerous zone has to be provided with warning signs and secured with a shutoff tape or other appropriate measures against entry by unauthorized persons.

17 Fault Diagnosis

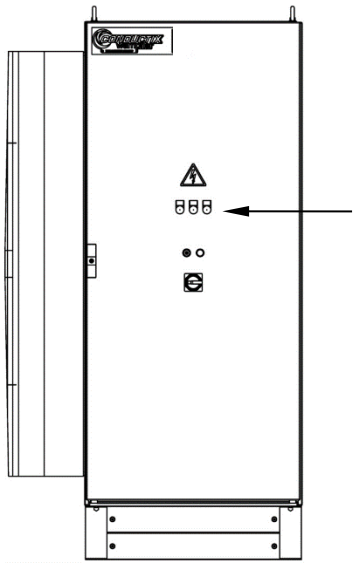
In case of faults at the Track Supply, e.g. no energy supply to the secondary components, check the display for indication of a possible cause. See chapter 7 Track Supply Module regarding the conditions.

ADVICE!

Attempts to repair or restart should be avoided! Do not use the system anymore as long as the error has not been located and repaired or defective components have been replaced by trained personal!

After conclusion of the failure analysis, the Track Supply has to be protected against touching of live parts by closed housing / covers. See safety advice in chapter 10.2 „General installation recommendations“.

Error display at the outside:



Status LEDs:

■ White:	Mains supply	→ power connection active
■ Green:	Track	→ track active
■ Red:	Error	→ stop due to errors

Fig. 14: Variant with optimum air conditioning unit

Whenever one of the LED's is active, the Track Supply is energized.
When no LED is active, make sure the Track Supply is not energized before opening the door/removing the covers.

DANGER!

Danger of electric shock!
The Track Supply is de-energized only if the voltage supply has been interrupted for at least 20 minutes by switching off or unplugging the power plug.

- After having disconnected the energy supply system from the supply voltage, do not touch any components of the power connections.
- Wait at least 10 minutes after switch-off before starting any works at the energy supply system or its component, so that voltages of the intermediate circuit condensers can fall down to < 60 V DC.

For a complementary error analysis, also see chapter 7 Track Supply Module.

ADVICE!

For notes regarding error display of the air conditioning unit see the documentation of the manufacturer.

18 Maintenance and Servicing

18.1 Safety

WARNING!

Danger of injury due to improperly executed maintenance tasks!
Improper maintenance can result in serious personnel injury or property damage.
- Before starting work, ensure that there is sufficient space for assembly.
- Maintain order and cleanliness in the assembly area! Loosely stacked or scattered components and tools are a source of accidents.
- If components have been removed, be careful to reinstall them properly, replace all fastening elements, and observe screw tightening torques.

WARNING!

Risk of injury due to insufficient qualification!
Improper use can result in serious injury to persons or property damage.
- All works for installation and commissioning as well as for maintenance and disassembly must be carried out by qualified staff (observe IEC 364 resp. CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and the national accident prevention regulations).
- All works for installation und commissioning must be carried out according to these mounting instructions. All the notes listed in this document must be strictly observed. It is moreover required to observe the general national prescriptions and specific factory regulations.

Adjustments concerning inductivity may only be made by qualified personnel of Conductix-Wampfler.

ADVICE!

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

18.2 Maintenance Schedule Track Supply IP54 (air cooling)

The tasks carried out according to the maintenance schedule must be logged. If regular inspections reveal increased wear, the corresponding maintenance intervals should be shortened in accordance with the actual signs of wear. In case of any questions regarding maintenance tasks and intervals, contact the manufacturer; see service address on the last page.

DANGER!

Danger of electric shock!
During maintenance and repair work the Track Supply must be secured against unexpected and unintended switch on.
- Prior to starting maintenance works disconnect the Track Supply from the mains supply!
- Do not make any structural changes! Always contact Conductix-Wampfler.

The following maintenance work should be carried out every 3 months:
- Check cables and terminals for wear and tear (mechanical damage, high temperatures)
- Visual inspection for external damage and damage due to special ambient conditions (e.g. damage of the housing cover, splash water, oil etc.)
- Inlet and outlet air are free - free airflow must be ensured. Ensure that the airflow and the air ducts are not blocked by any objects. Polluted filter pads must be replaced by new ones.
- Ensure that the Track Supply is dry, clean and free from dust and oil. If the Track Supply is very dirty, check the IP-protection and contact Conductix-Wampfler regarding appropriate cleaning measures.
- Ensure that all connections are firmly tightened.
- Make sure that all plugs are in the right place.

ADVICE!

The Track Supply is equipped with a standard filter for normal indoor environment. There are finer filters on the market, if required. We recommend the exclusive use of original filter by Rittal. In very challenging/dirty environment we recommend the installation of an air conditioned Track Supply IP54.

ADVICE!

Generally it is recommended to apply maintenance at least every 6 month. If the operating conditions are challenging and the environment is not clean, Conductix-Wampfler recommends shorter intervals than 6 months.

For a qualified check of the operating parameters of the system, please contact Conductix-Wampfler. Thus you can compare the currently measured values with those obtained during commissioning or the last inspection. Here you can also check free airflow inside the housing and specific torques.

WARNING!

Risk of personal injury of property damage!
Improper attachment of the housing cover can cause severe injuries to persons or damage to components.
- After having completed the maintenance and repair works, close the housing covers again, prior to restarting the system.

18.3 Maintenance Schedule Track Supply IP54 (air-conditioned variant)

The tasks carried out according to the maintenance schedule must be logged. If regular inspections reveal increased wear, the corresponding maintenance intervals should be shortened in accordance with the actual signs of wear. In case of any questions regarding maintenance tasks and intervals, contact the manufacturer; see service address on the last page.

DANGER!

Danger of electric shock!
During maintenance and repair work the Track Supply must be secured against unexpected and unintended switch on.
- Prior to starting maintenance works disconnect the Track Supply from the mains supply!
- Do not make any structural changes! Always contact Conductix-Wampfler.

The following maintenance and inspection works should be carried out every 3 months:
- Check cables and terminals for wear and tear (mechanical damage, high temperatures)
- Visual inspection for external damage and damage due to special ambient conditions (e.g. damage of the housing cover, splash water, oil etc.)
- Inlet and outlet air are free - free airflow must be ensured. Ensure that the airflow and the air ducts are not blocked by any objects. Air conditioning unit must be maintained in accordance with the maintenance instructions of the manufacturer of the air-conditioning unit.
- Ensure that the Track Supply is dry, clean and free from dust and oil. If the Track Supply is very dirty, check the IP-protection and contact Conductix-Wampfler regarding appropriate cleaning measures.
- Ensure that all connections are firmly tightened.
- Make sure that all plugs are in the right place.

ADVICE!

The Track Supply is equipped with a standard filter for normal indoor environment. If required, you will also find metal filters on the market for ambient conditions with oil-containing air. We recommend the exclusive use of original filters by Rittal.

ADVICE!

If the operating conditions are challenging and the environment is not clean, Conductix-Wampfler recommends shorter intervals of max. 6 months.

ADVICE!

For the maintenance of the air-conditioning system, see the documentation of the manufacturer (Rittal).

For a qualified check of the operating parameters of the system, please contact Conductix-Wampfler. Thus you can compare the currently measured values with those obtained during commissioning or the last inspection. Here you can also check free airflow inside the housing and specific torques.

ADVICE!

Refill and replacement of coolant only by qualified and authorized personnel! Disposal of the coolant may only be carried out by a specialist company!

WARNING!

Risk of personal injury of property damage!
Improper attachment of the housing cover can cause severe injuries to persons or damage to components.
- After having completed the maintenance and repair works, close the housing covers again, prior to restarting the system.

19 Repair

If repair works or the replacement of faulty components are required and possible on site these works have to be carried out by trained personnel or by a Conductix-Wampfler technician, but the relevant safety regulations must be observed. If fault analysis or repair is not possible on site, it is required to send the faulty part to Conductix-Wampfler GmbH. Please contact our service department in this case for further information.

To decide about the procedure we require the following information:
- Product designation
- Material number
- Serial number
- Configuration details (if existing)
- System data (technical and system-specific data)
- Circuit diagram of the system (if available)
- Pictures / photos (if available)
- Description of the fault or the failure scenario
- Presumptions for the failure analysis

General and local safety regulations must be observed. See also chapter 10 „Installation“ and chapter 11”Warnings and Precautions”.

If the device must be send back to Conductix-Wampfler, please observe the regulations and recommendations regarding transport and packaging (see chapter 9).

20 Disassembly and Disposal

20.1 Safety

WARNING!

Danger of injury due to improper disassembly!
Stored residual energies, sharp components, points, and edges on and in the device or the tools needed can cause injury.
- Prior to starting work, ensure that there is sufficient space.
- Handle open, sharp-edges components carefully.
- Maintain order and cleanliness in the work area! Loosely stacked or scattered components and tools are a source of accidents.
- Dismount components properly. Observe the heavy net weight of some components. If required use lifting devices.
- Secure components so that they cannot fall down or tip over.
- Involve the manufacturer in case of any unclear points.

WARNING!

Risk of injury due to insufficient qualification!
Improper use can result in serious injury to persons or property damage.
- All works for installation and commissioning as well as for maintenance and disassembly must be carried out by qualified staff (observe IEC 364 resp. CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN VDE 0110 and the national accident prevention regulations).

ADVICE!

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

20.2 Reuse

ADVICE!

If the Track Supply shall be reused, verify that no damage can occur during disassembly, transport or storage.

WARNING!

Risk of personal injury of property damage!
Improper use, faulty installation or handling may result in serious personal damage or property damage.
- For installation at another location observe the described mounting and commissioning activities.

20.3 Disassembly

After the system is no longer in use, the device must be disassembled and disposed of in an environmentally friendly way.

1. Disconnect the Track Supply from the mains supply.
2. Wait at least 10 min after having switched off the power supply until the internal storage will be discharged prior to opening the Track Supply.
3. Dismount the Track Supply.
4. Dispose of components specifically → recycling, see chapter 20.4 „Disposal“.

20.4 Disposal

Properly disassembled components are to be recycled if no return or disposal agreement has been made.

- Scrap metals.
- Take plastic elements to recycling.
- The other components are to be disposed of according to their material composition.

CAUTION!

Environmental damage due to improper disposal!
Electrical waste, electronic components, lubricants and other auxiliary materials are subject to hazardous waste disposal regulations and may only be disposed of by authorized specialists.

Local community officials or special disposal companies can provide information about environmentally appropriate disposal.

21 Spare Parts

Only the fuses and a few other components are to be replaced by the operator of the system! All other parts have to replaced or repaired by trained and qualified Conductix-Wampfler personnel.

Designation	Manufacturer identification	Conductix-Wampfler Mat.-No.	Used quantity	Comment
Fuse 35 A	Siba 5012434.35 14x51 Class gRL (gS)	**3092095**	3	**Only for 400 V versions!** Only by qualified personnel
Fuse 30 A	Siba 5012434.30 14x51 Class gRL(gS)	**3092176**	3	**Only for 480 V versions!** Only by qualified personnel
Cylindrical fuse Neozed D02 40A 400V GL/GG	Siemens 5SE2340 **Alternative type:** Fuses of the same installation size and technical data		3	**Only for 400 V versions!** Only by qualified personnel
Fuse 35 A, 600 VAC Class CD 47, 8x21.6 mm	Littelfuse CCMR035 **Alternative type:** Fuses of the same installation size and technical data		3	**Only for 480 V versions!** Only by qualified personnel!
Outlet filter	Rittal SK3173.100		4	**Only for variant with air cooling** Filter pad incl.
Filter pad	Rittal SK3286.400		1	**Only for air-conditioned variant**
External Ethernet plug Plug connector RJ45 CAT5 IP65 screaned	Han PP V14 RJ45 Cat5 Stvb 4p IDC 6.5-9.5			**For use with PROFINET**
Spare set fan TS6/16kW front		**3189820**	1	To be replaced only by qualified personnel.
Spare set fan TS6/16kW bottom		**3189833**	1	To be replaced only by qualified personnel.

Other on request.

22 Tools

Description	Size / specification	Comments
Hexagon wrench or ring wrench	SW 13	Cable connection (35 mm stranded cable)
Head screw driver	5 - 7 mm	Plug HAN-6HSB earth screw
Head screw driver	3 - 4 mm	Plug HAN-6HSB and HAN-10E
Allen key	3 mm	To open the Track Supply
Insulation stripping tool	-	-
Side Cutter	-	-
Screwdriver set		

Housing: For tools and further details see notes of RITTAL GmbH & Co. KG.

Air conditioning unit: For tools and further details see notes of RITTAL GmbH & Co. KG.

For commissioning you require further tools, a laptop with configuration software and a measuring device.

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