

Auto➔nterprise

T-COMPLEX

CHARGING COMPLEX



Operating Manual

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The software has been designed and installed exclusively for the Charging Complex operation and it should only be used for the purposes for which it was developed. The user is strictly prohibited from making any changes, transformations, or copying the software (except for necessary backups).

The Developer shall reserve the right to make changes regarding illustrations, tables, characteristics, and diagrams contained in this Operating Instruction at any time without prior notice to the consumers.

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SAFETY PRECAUTIONS

This Operating Instruction contains the necessary sections for technical data, technical maintenance rules, as well as safety instructions and recommendations for operating the Charging Complex.

Before starting the work, you should carefully study all the rules and recommendations in the Instruction and follow them during operation. This will ensure the reliable operation of the product and the safety of its use.

When working with the Charging Complex (ChC), the safety recommendations in this Manual, as well as the applicable local safety regulations and general safety regulations, should be observed.

Before starting any work on the Charging Complex, make sure that the Instruction, in particular the Safety section and the corresponding safety regulations, have been fully read by your personnel and fully understood.

Important safety instructions in this Manual are indicated by symbols. These safety instructions must be strictly followed. You should always pay attention to them and follow the safety requirements in order to avoid accidents, personal injury, or property damage.



WARNING!

Risk of injury or death.

This symbol indicates instructions that must be followed to avoid injury, trauma, or death.



ATTENTION!

Risk of property damage.

This symbol indicates instructions which, if not followed, may result in property damage, functional failure, and/or damage to the Complex or the vehicle connected to it.



WARNING!

Electric shock hazard.

This symbol warns of potentially hazardous situations involving electrical current. Failure to follow safety instructions increases the risk of serious injury or death. Care should be taken, especially during maintenance and repair.

**ATTENTION!**

This symbol indicates tips and information that should be followed to ensure an efficient and trouble-free operation of the Complex.

Strict adherence to the safety precautions outlined in these Operating Instructions and extreme care when using the equipment are essential to prevent and to reduce the likelihood of injury or damage to the equipment.

The Manufacturer shall not be responsible for any direct or indirect damages resulting from the use or the work with the electrical circuits of the equipment or the software described in this Manual.

The Manufacturer shall not be responsible for damage and/or malfunction caused by non-compliance with the requirements of the Manual.

The Manufacturer shall not be responsible for any personal injury or property damage, whether indirect or specific in nature, consequential damages, loss of business profit, interruption in work or loss of business information as a result of using the equipment described in the Manual.

Due to continuous improvement, the Developer shall reserve the right to make changes to the design of the equipment described in the Manual without prior notice.

1. GENERAL INFORMATION

1.1 APPLICATION

T-COMPLEX is a high-quality Charging Complex designed and manufactured using effective solutions in the field of power electronics and technology based on a modern element base, using microcontroller signal processing technology, which ensures its high efficiency, functionality, and reliability. The solutions together with software and available interfaces, provides a flexible and productive charging solution for electric vehicles.

The product has been designed to control and to convert the energy consumed from a three-phase 230/400V AC network into DC and AC voltage for charging the e-vehicle battery.

The product is equipped with an intelligent microcontroller operating system and communication devices that provide information exchange with an electric vehicle and set the amount of current and charging voltage, in accordance with the needs of the e-vehicle in real time.

The product has been designed for the simultaneous connection of up to five vehicles.

1.2 CHARGING COMPLEX FUNCTIONALITIES

Mounting type	Wall / Floor
Online monitoring of device operation	Yes
Ability to adjust the charge current	Yes
Possibility of setting the rate at the Charging Complex	Yes
Single case execution	Yes
Display	Yes
Indication of the consumed electricity amount	Yes
User-defined interface management	Menu functions are controlled via the app
Emergency stop button	Yes
Bottom power cable entry	Yes
Case material	Steel with anti-corrosion coating

1.3 SPECIFICATIONS

Charging mode, according to IEC 61851-1	Mode 3, Mode 4
Rated input voltage	3 phases, 400V
Maximum permissible input voltage deviation, no more than	±10%
Rated power supply frequency	50/60Hz
Maximum permissible deviation of the mains frequency	±0.2Hz
Electric power consumed from the network, maximum	30kV·A – 303kV·A
Display	• LED display 17"
Operational capabilities of the Complex	RFID card (IEC 14443-1); Mobile app; Chip tag (optional)
Mechanical protection class, according to IEC 62262	IK10
Enclosure rating, according to IEC 60529	IP54
Ambient temperature	from -35°C to +50°C
Relative humidity	no more than 95% without moisture condensation
Weight, kg	491
Overall dimensions (H×W×D), mm	1778×495×2655
Communication (standards and protocols)	
2G	GSM GPRS Class 12, Quad-band: 850 / 900 / 1800 / 1900MHz
3G/4G (LTE)	LTE Cat 1, LTE-FDD: B1/B3/B7/B8/B20/B28A; GSM: B3/B8
RFID	ISO 14443 (A) (Mifare)
Ethernet	IEEE 802.3
Wi-Fi	802.11 a/b/g/n
OCPP	OCPP 1.6

1.4 CHARACTERISTICS OF THE STATION CONNECTORS

Charging complex port	Type 1 (SAE-J1772)	
		
	Maximum output power	9.2kW 18.4kW
	Maximum charge current	40A 80A
	Maximum charge voltage	230V
Cable length	6.5m	
Charging complex port	Type 2 (Mennekes)	
		
	Maximum output power	22kW 43kW
	Maximum charge current	3×32A 3×63A
	Maximum charge voltage	400V
Cable length	6.5m	
Charging complex port	CHAdeMO	
		
	Maximum output power	90kW
	Maximum charge current	200A
	Maximum charge voltage	500V
Cable length	6.5m	

Charging complex port	CCS (Type 1) 	
Maximum output power	120kW	160kW
Maximum charge current	300A	
Maximum charge voltage	500V	1,000V
Cable length	6.5m	
Charging complex port	CCS (Type 2) 	
Maximum output power	120kW	160kW
Maximum charge current	300A	
Maximum charge voltage	500V	1,000V
Cable length	6.5m	
Charging complex port	GB/T AC 	
Maximum output power	22kW	43kW
Maximum charge current	3×32A	3×63A
Maximum charge voltage	400V	
Cable length	5m	
Charging complex port	GB/T DC 	
Maximum output power	90kW	
Maximum charge current	250A	
Maximum charge voltage	500V	
Cable length	5.5m	

1.5 CHARGING COMPLEX MODIFICATIONS

The Charging Complex is available in various configurations, which are formed depending on the availability of connectors and the power of the DC-part of the Charging Station (150-180-210-240kW).

The power value of the Charging Station, depending on the configuration, shall be determined from Table 1.

Table 1. Charging Station power

P _{Type1}	P _{DC} = 150kW					P _{DC} = 180kW				
	Type1 is absent	150	172	194	193	236	180	202	224	223
1xType1 (9.2kW)	159.2	181.2	—	202.2	—	189.2	211.2	—	232.2	—
2xType1 (18.4kW)	168.4	—	—	—	—	198.4	—	—	—	—
1xType1 (18.4kW)	168.4	190.4	—	211.4	—	198.4	220.4	—	241.4	—
2xType1 (36.8kW)	186.8	—	—	—	—	216.8	—	—	—	—
P _{Type1} P _{Type2}	Type2 is absent	1xType2 (22kW)	2xType2 (44kW)	1xType2 (43kW)	2xType2 (86kW)	Type2 is absent	1xType2 (22kW)	2xType2 (44kW)	1xType2 (43kW)	2xType2 (86kW)

P _{Type1}	P _{DC} = 210kW					P _{DC} = 240kW				
	Type1 is absent	210	232	254	253	296	240	262	264	263
1xType1 (9.2kW)	219.2	241.2	—	262.2	—	249.2	271.2	—	272.2	—
2xType1 (18.4kW)	228.4	—	—	—	—	258.4	—	—	—	—
1xType1 (18.4kW)	228.4	250.4	—	271.4	—	258.4	280.4	—	281.4	—
2xType1 (36.8kW)	246.8	—	—	—	—	276.8	—	—	—	—
P _{Type1} P _{Type2}	Type2 is absent	1xType2 (22kW)	2xType2 (44kW)	1xType2 (43kW)	2xType2 (86kW)	Type2 is absent	1xType2 (22kW)	2xType2 (44kW)	1xType2 (43kW)	2xType2 (86kW)

2 COMPLETE SET

Wall mounting	
T-Complex Charging Station	1
Operating Manual	1
Insert	1
M16 nut	4
Washer 16	4
Additional accessories	
Cable pull-up unit (tensioner)	2

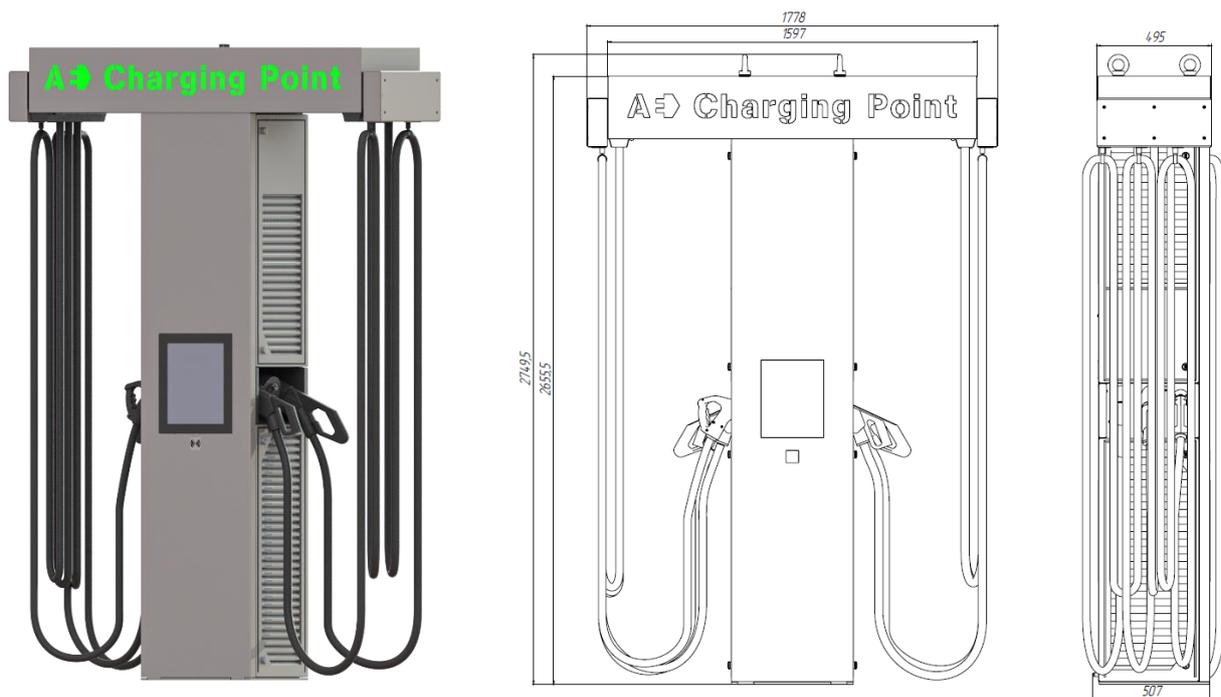


Figure 1 – Appearance and dimensions of the Station

3 LABELLING AND MARKING

The labeling and marking of the Charging Complex is made on the nameplate located on the side panel of the Station case.

4 SETTING-UP PROCEDURES

4.1 OPERATING RESTRICTIONS



The Charging Station is designed exclusively for charging electric vehicles.

Please charge only compatible e-vehicles.

Failure to comply with the requirements for operation, technical maintenance, and repair described in this Manual excludes any liability of the Manufacturer in the case of malfunctions in the Complex operation.

According to IEC 60947-1, the installation altitude of the Charging Complex above sea level should not exceed 2,000m.

Please follow the safety instructions to avoid injury and material damage when working with the Complex.

During the installation and operation of the Charging Complex, the following should be observed: the Rules for the Design of Electrical Installations, the Rules for the Technical Operation of Electrical Installations of Consumers, the Safety Rules for the Operation of Electrical Installations of Consumers in terms of electrical installations up to 1,000V, according to GOST 22261.

By the method of protecting a person from electric shock, the Charging Complex corresponds to Class 1, in accordance with GOST 12.2.007.0.

4.2 CHARGING COMPLEX MOUNTING

Please make sure the installation site has adequate GSM or 4G (LTE) cellular coverage. Cellular repeaters may be required to ensure good signal strength in underground garages or other enclosed parking lots.

It is recommended to locate the Complex under a canopy to protect it from direct exposure to precipitation and sunlight.

For the Charging Stations, the site should be prepared in advance by following the instructions below.

When choosing a location for the Charging Complex, the following conditions should be met: there must be a distance of at least 1 meter between the case of the Charging Complex and a wall or any obstacle. Adequate space for servicing should be provided in front and behind the ChC.

The Complex shall be installed on a foundation (a prepared concrete foundation) measuring 1,300×1,300×500mm. Underground utilities should not be laid in the foundation area.

The foundation shall be poured into a well-rammed base with a pre-laid cable duct and a placed metal insert. For the foundation, it is necessary to use a mixture of crushed stone with cement at least M400. The surface of the foundation should be carefully leveled to avoid distortion of the Station during mounting.

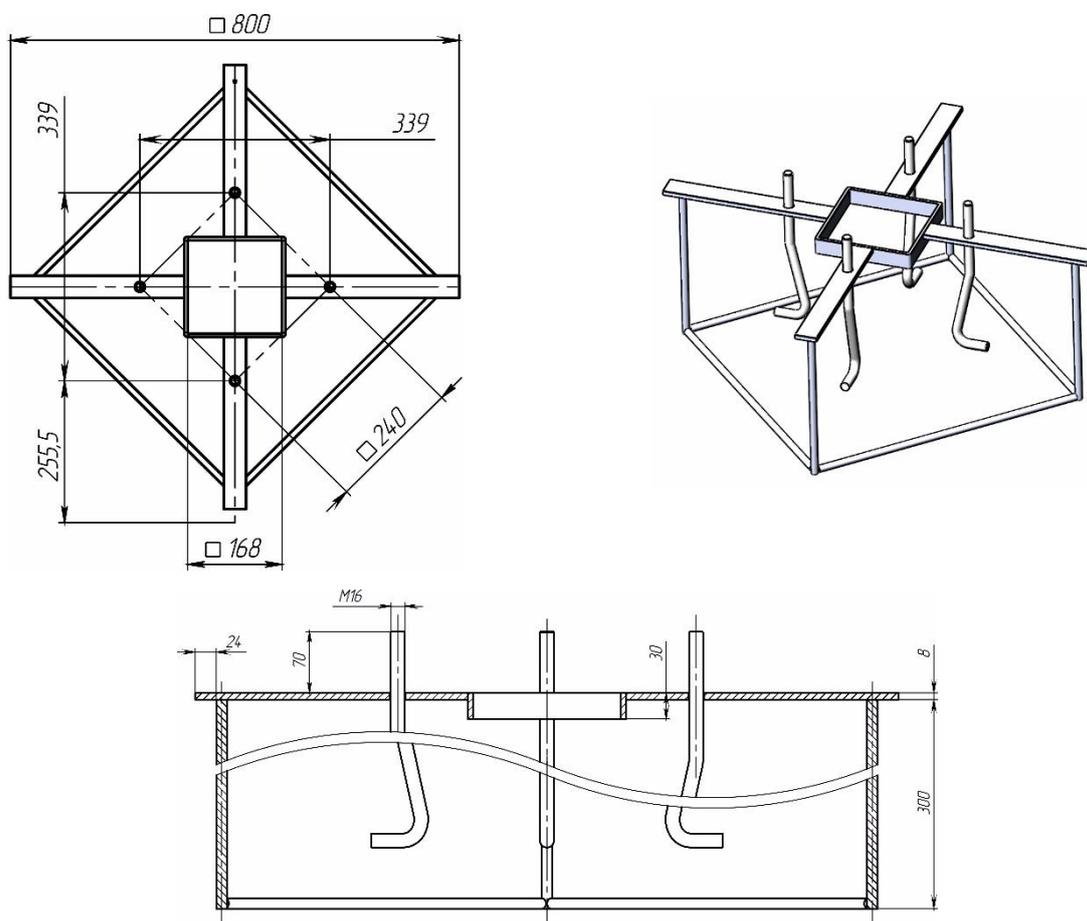


Figure 3 – Appearance and dimensions of the insert

The dimensions of the pedestal foundation of the Charging Complex are shown in Figure 4, the thickness of the plate is 8mm.

Along with the preparation of the foundation, it is necessary to ensure the laying of the power electrical cable (not included in the delivery set). The required cable length above the foundation is at least 0.6 meters.

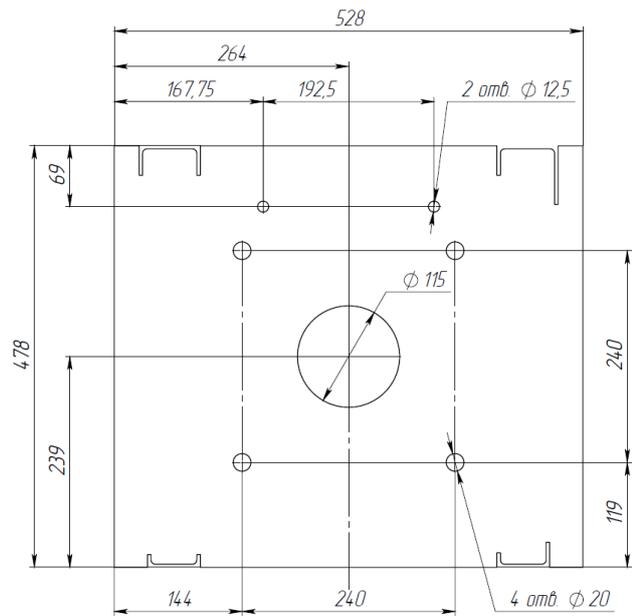


Figure 4 – The pedestal foundation (bottom view)

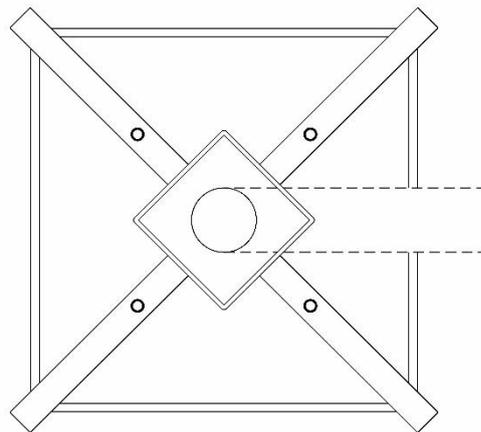
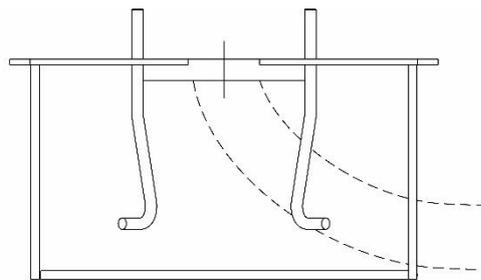


Figure 5 – The Station foundation



WARNING!

Only qualified personnel should connect the power cable to the AC mains.

It is recommended to select the cross-section of the power cable based on the ChC power (copper stranded conductor with a cross-section of $5 \times 50 \text{mm}^2$ to $5 \times 185 \text{mm}^2$) and conditions of use (in accordance with GOST 31996-2012, IEC 60502-1).

Table. Recommended cross-section of power cable (cable laying in the ground)

Charging Station power, kW	Power cable cross-section, mm ²
<150	5×50
150-180	5×70
180-217	5×95
217-253	5×120
253-286	5×150
286-329	5×185

When laying the power cable, an AC circuit breaker should be installed between the Complex and the mains. Depending on the Charging Complex power and the number of connected phases, it is recommended to use a 2-pole (for single-phase connection), 4-pole (for three-phase connection) circuit breaker in the range from 160A to 350A.

4.3 CONNECTING THE CHARGING COMPLEX

After the Complex has been transported, before installing it, please make sure that all internal elements are properly fixed and there is no mechanical damage.

Please check the quality of the connections of wires, stubs, connectors. Please check the tightening torque of the terminals, bolted, screw connections, switching devices.

The Charging Complex does not require any special settings and adjustments before being put into operation.

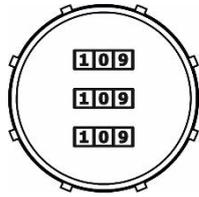
Before connecting the Charging Complex, please make sure that:

- The mains supply cable is de-energized by external disconnecting devices.
- The mains power input has a connection diagram: 3 phases with separate neutral (N) and ground (PE) conductors.
- When connecting with a 4-wire cable, please carry out the protective grounding with a separate wire.

In order to connect the Complex to the electrical circuit, it is necessary to open the ChC cover and to lead the power cable through the inlet cable channel into the Station.



ATTENTION!



A digital security lock is used. The default lock code is "000".



In order to change the lock code, you need to press the button on the lock and, while holding it, to change the digital code to the required one.

Кнопка для изменения кода	Button to change the code
---------------------------	---------------------------

Next, you need to connect the power cable to the corresponding transfer busbars (as shown in Figure 6). In case of connection with a 4-wire cable, external grounding should be carried out with a wire with a cross-section of at least 25mm², using an M10 bolted connection with the inscription "PE" located in the terminal compartment.

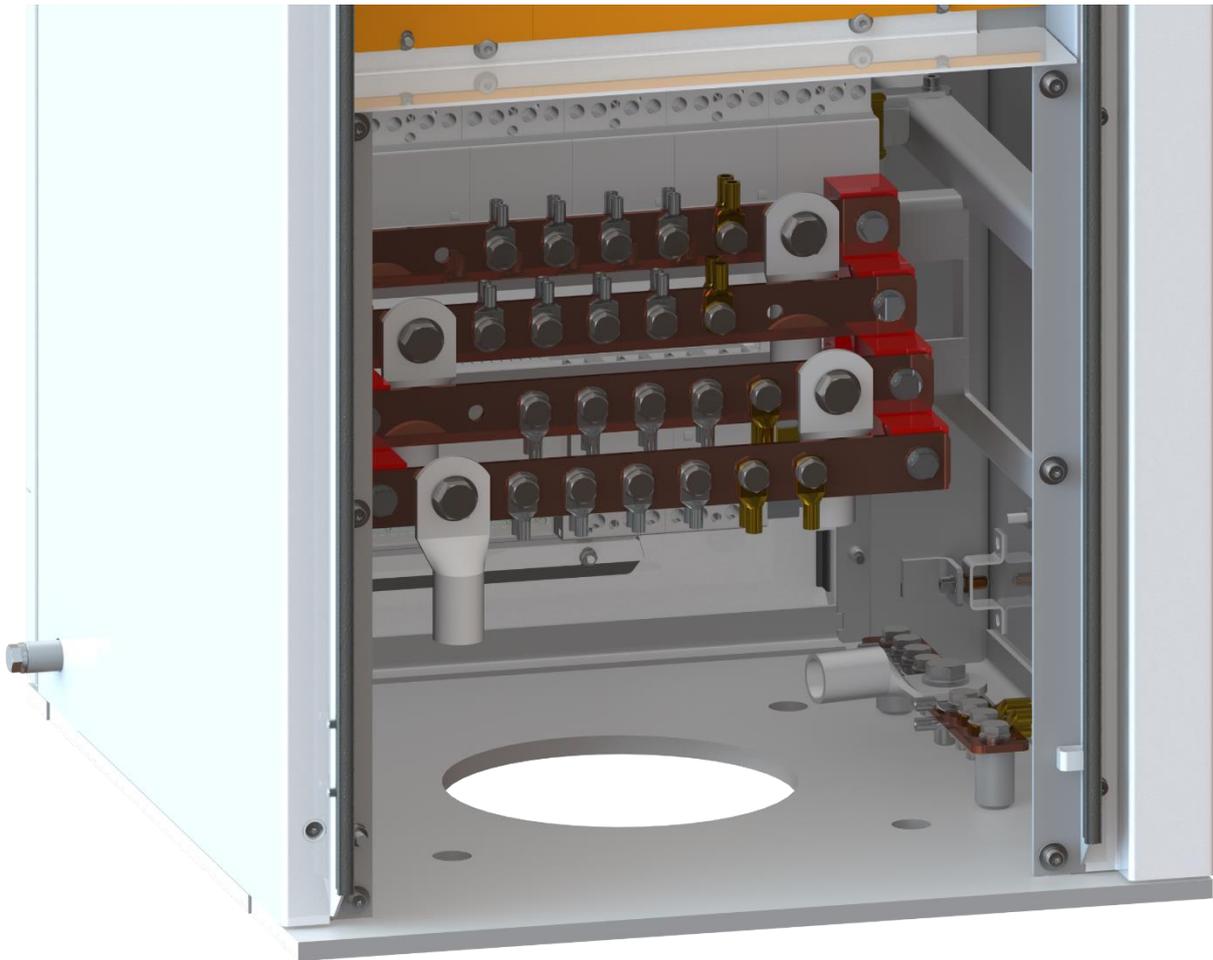


Figure 6

ATTENTION!

THE FIRST CONNECTION THAT SHOULD BE PERFORMED IS THE GROUND WIRE TO THE GROUND BUS LABELED "PE"

IT IS FORBIDDEN TO TURN ON THE CHARGING COMPLEX WITHOUT A CONNECTED GROUNDING!

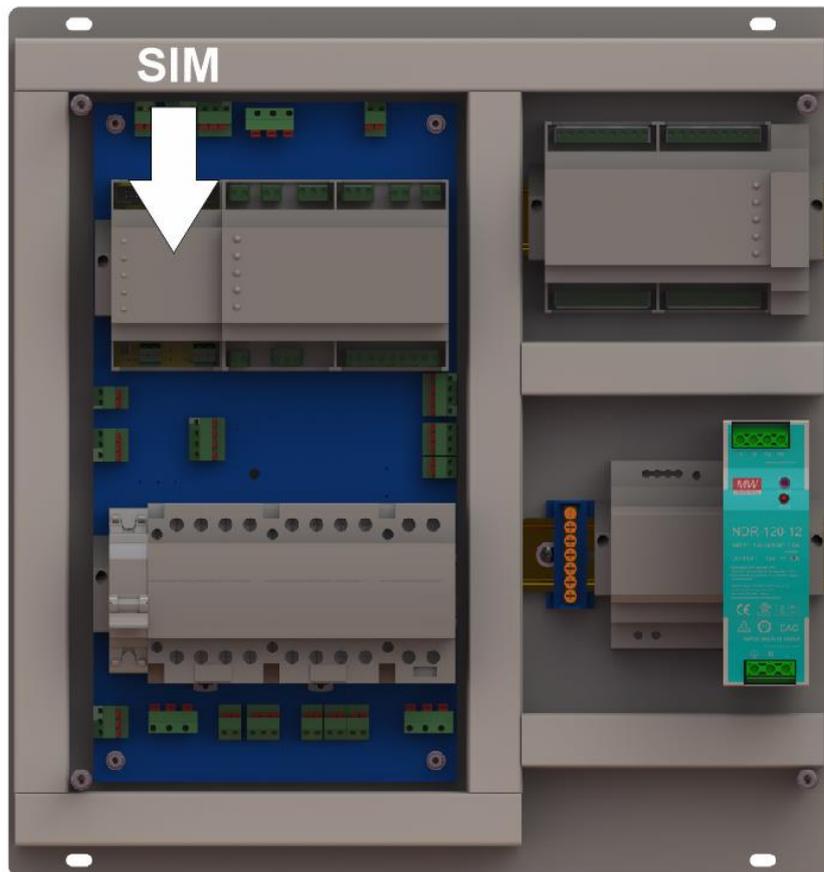
Failure to comply with this requirement may lead to voltage supply to the Charging Complex case, electric shock to service personnel and consumers, as well as to the Charging Station failure.

Further, with the external switching devices, it is necessary to connect the power cable to the AC network and then to turn the three-pole circuit breakers into the operating position.

In order to turn on the Charging Complex, it is necessary to:

- Install the SIM card of the mobile network operator (if an external SIM card is used). To do this, please follow these steps:

- remove the modem cover;
 - install a SIM card;
 - close the modem cover.
- Move the circuit breakers to the operating position (up).
 - Move the circuit breaker on the switchboard to the operating position (up).



5 INTENDED USE

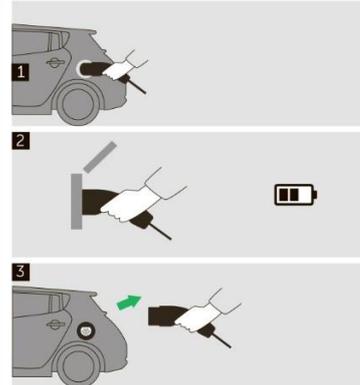
5.1 OPERATING MODES AND ELECTRIC VEHICLE CHARGING

Information about the ChC operating modes (the state of the connectors and the charging parameters) is shown on the display. The display also shows data on software versions, a modem number, the Station number in Autoenterprise billing, a mobile network status, etc.

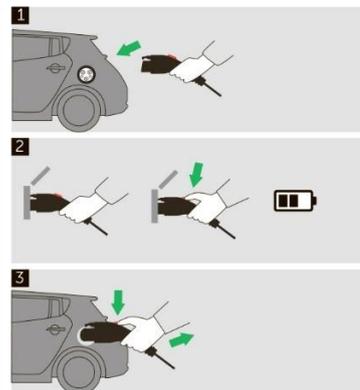
The information shown on the display depends on the software version and may differ from version to version.

5.2 CONNECTING THE VEHICLE

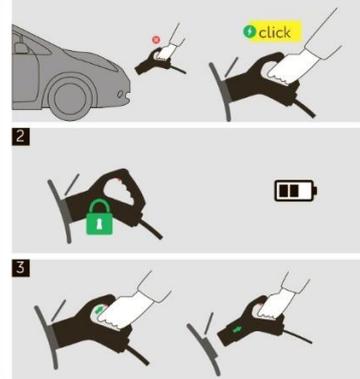
Разъем AC.
Type2



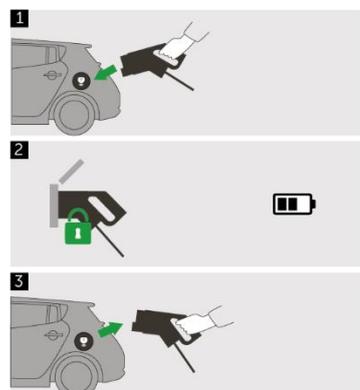
Разъем AC.
Type1



CHAdeMO коннектор.
Разъемы CHAdeMO имеют кнопку блокировки.



CCS Combo (Type 1 and Type 2).





Разъем AC	AC connector
CHAdeMO коннектор. Разъемы CHAdeMO имеют кнопку блокировки.	CHAdeMO connector. CHAdeMO connectors have a lock button.

5.3 INDICATION OF SAFETY MEASURES

In emergency situations, the Charging Complex turns off the input power electrical circuits using differential relays.

The Charging Complex operating system is powered from the mains through an additional circuit breaker.

The output cable is connected via grommets/cable glands.

On the bottom panel of the Complex case, there is an emergency stop button in the DC charging mode.

Pressing the emergency stop button in DC charging mode the electrical circuit that charges the battery of the e-vehicle automatically turns off. At the same time, the message “EMO PRESSED” appears on the display.

In order to continue the operation of the Complex, the emergency stop button should be manually returned to its original state (turn the button counterclockwise).

6 CHARGING COMPLEX MAINTENANCE



ATTENTION!

All maintenance work should be carried out by the Manufacturer's representative or a qualified technician. Do not attempt to carry out

maintenance work yourself, as this may result in electric shock and/or loss of functionality of the Charging Complex.

Improper maintenance can result in a serious injury or an equipment damage. For this reason, this work can only be performed by authorized, trained personnel who are familiar with the principles of the Complex operation and strictly adhere to all safety instructions.

The use of explosive or flammable cleaning agents creates a fire or explosion hazard.

Do not store flammable or explosive liquids near the Charging Complex.



ATTENTION!

Please ensure that the Charging Complex is de-energized before carrying out any maintenance work.



INFORMATION

In order to ensure the maximum service life of the Complex, it is recommended to regularly maintain the cleanliness of the internal space of the Charging Complex.

During operation, the following routine maintenance shall be performed:

- Visual inspection for the equipment overheating; check, tightening of connections;
- Replacement of filters;
- Identification of defective parts, assemblies, their repair and replacement.

The filters of the Complex should be replaced at least once every 6 months. When the Charging Complex is operating in conditions of increased dustiness, it is recommended to carry out extraordinary routine maintenance for preventive cleaning of the internal elements of the Complex from dust at least 1 time in 3 months.

Before starting any maintenance or cleaning work on the Charging Complex or working on any circuits connected to the Charging Complex, the authorized service personnel should disconnect all AC sources from the Charging Complex to reduce the risk of electric shock.

Perform a preventive check of the Charging Complex at least once every 3 months. To do this, after disconnecting the Charging Complex from live circuits, thoroughly clean its case, contacts, and ventilation holes from dust and dirt and check the quality of the wire fastening. The terminal block screws and wire lugs should be tight and the insulation should not be damaged.

It is strictly forbidden to modify or alter the design of the Charging Complex in any way without the written consent of the Manufacturer!

All signs, labels, and pictograms placed on the Charging Complex must be visible and readable. Signs, labels, or pictograms that have been damaged or illegible must be replaced immediately. Please contact the Manufacturer to agree on such issues.

7 TROUBLESHOOTING

Malfunction, external manifestations, and additional signs	Possible reason	Troubleshooting method
Loss of connection with the server	Modem failure / SIM card is inoperative	Replacing the GSM modem or checking the status of the SIM card
	Poor signal strength of the mobile network / The antenna of the GSM modem failed / The Station location outside the coverage area of the mobile network	Replacing the antenna with a more powerful one
Damage to the charging cable or connector	Physical deterioration, careless handling of equipment	De-energize the device. Contact technical support for cable replacement
The Charging Complex display does not work (there is no information on the Station display)	No input voltage	Find out the reason for the lack of input voltage and restore the power supply
	Circuit breakers tripped	Bring the circuit breakers to the operating position
	Display is defective	Contact the Technical Support Service
Other malfunctions	Malfunctions caused by	Contact the Technical Support

Malfunction, external manifestations, and additional signs	Possible reason	Troubleshooting method
	external and internal factors	Service

TECHNICAL SUPPORT

You can contact the Technical Support Service in any way convenient for you indicated on the website.

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In order to quickly resolve the problem, it is necessary to report the Station modem number or the Station number in the Autoenterprise billing.

8 STORAGE

The Charging Complex should be stored in its original package until it is installed at the place of permanent use.

STORAGE CONDITIONS:

- The Charging Complexes should be stored in dry, heated rooms, free of dust, corrosive materials, vapors, and combustible materials.
- Store the Charging Complex in a warehouse with adequate weather protection.
- During storage, the Charging Complex should be protected from shocks.
- Storage temperature: 0°C to +40°C (32°F to 104°F).
- Relative humidity should be no more than 85%.

9 TRANSPORTATION

The Charging Complexes should be transported in transport package by rail, by truck, and by air without limiting the distance of transportation, taking into account the rules for the carriage of goods applicable to these modes of transport.

When transporting, the center of gravity of the Charging Complex should be taken into account in order to minimize the risk of tipping over.

During transportation, the Charging Complexes should be reliably protected from movement inside the vehicle. Straps and padded inserts should be used to secure the Complex and steps should be taken to protect the Complex from damage by other items being transported.

Transportation terms and conditions of the Charging Station are OZh4 (extra severe conditions), according to GOST 15150.

At the same time, protection of the Complex from mechanical movements (fastening) and precipitation should be ensured.

The weight of the Charging Complex in the transport package does not exceed 380kg.

10 DISPOSAL



ATTENTION!

Do not dispose of the Charging Complexes with household waste!

The electronic components of the Charging Complexes should be disposed of in accordance with current legislation regarding the disposal of electronic and electrical waste.

If you have any further questions, please contact your supplier.

11 ACCEPTANCE CERTIFICATE

CHARGING COMPLEX

<small>PRODUCT NAME</small>	
T-COMPLEX	XXXXXXXXXX
<small>DESIGNATION</small>	<small>PRODUCTION SERIAL NUMBER</small>
manufactured and accepted in accordance with the mandatory requirements	
EN 61851-1, EN 61851-23	and found fit for service
<small>RD code</small>	

Chief of QCD

L.S.

SIGNATURE

PRINT FULL NAME

DATE

12 MANUFACTURER'S WARRANTY

The Manufacturer shall guarantee that the quality of the product shall meet the requirements of the Operating Manual.

Consumer requirements that comply with the law can be submitted during the warranty period.

The warranty period from the date of the product commissioning is 12 months, but it can be changed when signing a supplementary agreement, from the moment the product is delivered to the consumer.

The service life of the equipment is 10 years.

Warranty for parts and components after their repair by replacing them during the warranty period is 12 months from the repair date, but not less than the warranty period for the equipment as a whole.

The warranty shall not apply to the equipment damaged as a result of:

- incorrect electrical, mechanical connection;
- use of the equipment for purposes other than those intended ones or in accordance with the Operating Instruction;
- external mechanical influences or violation of the rules of transportation and storage;
- non-compliance of electrical power with the standards and norms specified in the Operating Instruction;
- actions by third parties or force majeure;
- dismantling, maintenance, or repair carried out by a person who is not a representative of the manufacturing company;
- changes in the product design, not agreed with the Manufacturer.

The Manufacturer of the equipment shall not be responsible for possible costs associated with the installation and dismantling of the warranty equipment, as well as for damage caused to other equipment located at the consumer's as a result of malfunctions (or defects) that occurred during the warranty period.