

CONNECTION TO OCPP CENTRAL SYSTEM CONFIGURATION MANUAL

DISCLAIMER:

THIS DOCUMENT IS VALID FOR CHARGERS EQUIPPED WITH TELTONIKA RUT950/951 ROUTERS
MANUFACTURED FROM 09.2024.

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Introduction.

The purpose of this manual is to provide an overview of configuration of the charger so it can be connected to OCPP Central System.

Manual assumes that technician performing the configuration has basic knowledge of OCPP standard and network equipment.

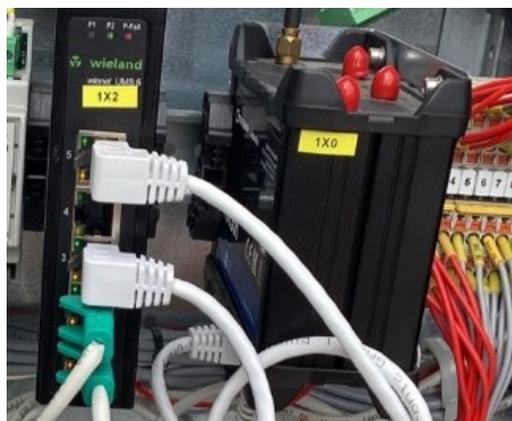
The charger, by default, is equipped with a Teltonika router (usually RUT951), that is the gateway for the charger to the Charge Point Operator's (CPO) network. The router is capable of using a GSM connection (2G, 3G or LTE) or Ethernet (ETH) connection. Fiber-optic connection is also supported, though it requires additional equipment for this and from the router's point of view it's configuration is the same for ETH or Fibre solutions.

GSM part of the router consists of two Standard SIM format card slots that allow fail-over connection. Only one SIM card can be used at the same time. The default configurations assumes using slot SIM1 for the card.

For ETH connection, router is equipped with 4 ETH ports: 3 ports for LAN, used for charger's internal communication and 1 WAN port, used to connect to CPO's network.



Teltonika RUT951 overview.



Example of Teltonika RUT951 (marked 1X0) inside Axon Easy charger next to a network switch.

Preparation.

First step when preparing to configure the chargers is to decide what will be the medium for communication: GSM or ETH, as configuration of the router will vary, there's no need to change the GSM settings when ETH is being used and vice-versa. With that in mind, different equipment and information will be required and it's good to have them at the ready when beginning setup.

Tools and equipment required:

- Keys to open the charger.
- ETH cable to connect to the charger locally (3-5m UTP cat.5e or better).
- Laptop with ETH port and web browser installed (changing static IP address of the laptop may be required, so make sure it's possible).
- SIM card (if connecting to Central System via GSM), the card should be active, capable of data transfers in roaming (if needed).

Information required:

- Settings for SIM card (if connecting via GSM) - APN name (if required), credentials and authentication type (if required), specific DNS settings (rebind protection off, specific server address).

NOTE: When using a public SIM card, that doesn't require connecting to a private APN, no further configuration is required for the GSM connection.

- Settings for WAN port (if connecting to Central System via ETH/Fibre) - IP, Mask, Gateway, DNS servers, other settings.
- OCPP settings for Central System (WebSocket URL, ChargePointID, AuthenticationKey if required).

The configuration process consists of two major steps:

1. Router configuration - setting up the network connection between the charger and the Central System using preferred medium. This step is done on the router's WEB GUI.
2. Charger configuration - setting up OCPP configuration in the WEB interface of the Charger Management Console - the CMC.

In most cases this is also the preferred order of configuration - network first, OCPP second.

Regardless of type of medium used for communication to the Central System, there are two methods of connecting the configuration laptop to the charging station:

- Using a free LAN port on the router or a switch.
- Using WAN port on the router.

The latter one is often dependent on type of the charger, mobile chargers usually have this port extended to the charger's outer casing (please refer to the charger's documentation regarding it's location). Stationary chargers often have this port extended near the bottom on the inside of the casing for easier connection to network wiring coming out of the foundation.

Accessing both the router's web UI and the charger's CMC will vary slightly, depending on method used to connect to the charger.

Credentials

The default credentials for the router and the CMC are as follows:

Charger Management Console	Username: customer
	Password: xxQpBL8e89jrZhmp
Router	Username: customer
	Password: Fws*urR/<\P5?n7\

NOTE! Username and passwords are case-sensitive.

The username is set and cannot be changed, however the passwords can be changed if needed.

Connecting to the charger.

Using the LAN port.

For this method no changes in laptop's network settings is necessary, usually the interface will be set to automatic and the router will set the laptop's interface using DHCP. If however laptop's interface is set to static, then it needs to be either set to an address in the same range, as the chargers' network (ex. 192.168.14.50) or to an Automatic/DHCP mode.

When using the LAN port, the addresses will be:

Router:	http://192.168.14.254
Charger Management Console:	http://192.168.14.190

Using the WAN port.

For this method to work, the laptop needs to be set in the same network address range, as the router's WAN - for example: 192.168.10.50

When using the WAN port, the addresses will be:

Router:	http://192.168.10.100
Charger Management Console:	http://192.168.10.100:8190

NOTE: When configuring the router to use ETH connection to the Central System using WAN port to access the router, it's advised to leave the router configuration for last, as changing the IP address of the WAN port will lock out access at the predefined IP address listed above. While still possible to set the network first it will require reconfiguration of laptop's ETH interface for the new configuration of the WAN port.

Router configuration

Setting up GSM connection

After logging onto the router, proceed to [NETWORK], then [WAN]. This window will list all the WAN interfaces on the router. As RUT951 has two SIM slots, each can be configured individually, for example when using two different GSM operator for main and fail-over connection.

Network > WAN

ID	Name	Status	Type	IP	Protocol	Uptime	TX	RX	Enable	Fallover
1	wlan0	Down	Wireless	-	dhcp	-	0 B	0 B	Off	Off
2	mob1s2a1	Down	Mobile	-	Auto	-	0 B	0 B	Off	Off
3	mob1s1a1	Down	Mobile	-	Auto	-	0 B	0 B	On	Off
4	wan	Up	Wired	192.168.10.100/24	static	1h 40m 17s	7.64 MB	2.5 MB	On	Off

For SIM1 slot, the interface [mob1s1a1] needs to be configured. For SIM2 slot, [mob1s2a1]. Click [Edit] to open the settings window.

Name *

Protocol

Mode

PDP type

SIM

Auto APN

APN

Custom APN

Authentication type

In most cases the only settings that need to be changed here are the APN related ones:

- **Auto APN** - when ON will use the default APN for the SIM card operator; when OFF, a custom APN can be used.
- **APN** - a list of all APNs available on the SIM, usually only one is provided by the SIM operator. Set to [- - Custom - -] to enable additional fields to input the custom APN name into.
- **Authentication type** - if username and a password are required for the APN, a type of authentication needs to be selected, available options are PAP and CHAP. When selected anything other than None, additional fields for **Username** and **Password** will appear.

When all necessary fields are filled in, use the [Save & Apply] button at the bottom.

After a few moments, the connection should be established:

1 mob1s1a1	Status: Up Type: Mobile	IP: APN SIM IP ADDRESS APN: YOUR APN HERE SIM: 1	Uptime: 2d 0h 0m 47s TX: 9.25 MB RX: 1.54 MB
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This means that the SIM card successfully connected to the APN.

Setting up ETH connection

After logging onto the router, proceed to [NETWORK], then [WAN]. This window will list all the WAN interfaces on the router. ETH is done via [wan] interface. Click [Edit] to open the interface configuration window.

Network > WAN

WAN interfaces						
1	wlan0	Status: Down Type: Wireless	IP: - Protocol: dhcp	Uptime: - TX: 0 B RX: 0 B	Edit Delete	Enable: <input type="checkbox"/> Failover: <input type="checkbox"/>
2	mob1s2a1	Status: Down Type: Mobile	IP: - APN: Auto SIM: 2	Uptime: - TX: 0 B RX: 0 B	Edit Delete	Enable: <input type="checkbox"/> Failover: <input type="checkbox"/>
3	mob1s1a1	Status: Down Type: Mobile	IP: - APN: MyAPN SIM: 1	Uptime: - TX: 0 B RX: 0 B	Edit Delete	Enable: <input checked="" type="checkbox"/> Failover: <input type="checkbox"/>
4	wan	Status: Up Type: Wired	IP: 192.168.10.100/24 Protocol: static MAC: 00:1E:42:3E:DB:A4	Uptime: 2h 6m 43s TX: 10.47 MB RX: 3.53 MB	Edit Delete	Enable: <input checked="" type="checkbox"/> Failover: <input type="checkbox"/>

Add

Save & Apply

In most cases, the only fields that need to be altered are the ones relating to addresses:

Enable on

Name *

Protocol

IPv4 address *

IPv4 netmask *

IPv4 gateway

IPv4 broadcast

DNS servers +

- **Protocol** – usually [Static] or [DHCP], in most cases Static is used, as it allows to make a static map of what device is located where on the network
- **IPv4 address, netmask and gateway** – values provided by CPO’s network administrators.
- **DNS servers** – primary is often the same as IPv4 gateway, additional server can be added using [+].

When all necessary fields are filled in, use the [Save & Apply] button at the bottom.

2 wan	Status: Up Failover: Disabled Type: Wired	IP: 192.168.2.154/24 Protocol: static MAC: 20:97:27:08:58:15	Uptime: 39d 1h 53m 26s TX: 88.76 MB RX: 1.71 GB
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Status of the network [Up] means that the connection is live – there is a device connected on the other end of it, it doesn’t necessarily mean that it’s configured correctly, though if TX and RX values increase over time, it usually means that there is a data exchange between the devices, indicating proper configuration.

Charger Management Console configuration (CMC)

OCPP configuration is done via the CMC installed in the main charging controller in the charger. After logging into the application, the [OCPP Local Authorization list] is the default view, however all the settings are in the [Settings] section at the top.

The Settings tab consists of all the OCPP Configuration Keys that the charger supports. They can be used to configure the charger behavior when not connected to a central system and nearly all of the keys can be modified from the Central System, once the charger is connected.

NOTE: The configuration keys are listed in alphabetical order.

In order to set up the connection, only a few keys need to be changed:

Key	Description
AuthorizationKey	(OPTIONAL) OCPP authorization key, needed if Central System uses WebSocket authorization.

Key	Description
AuthorizationKeyHexadecimalEnabled	If AuthorizationKey is used, this key informs the charger if the key supplied is a plain text (OFF) or a hexadecimal encrypted (ON)
ChargerId	Charger ID in the Central System, default value is the charger SN, Central System administrator may provide custom key.
SecurityProfile	If AuthorizationKey is used, then [2], if not [0]
websocketUrl	URL to the Central System, the whole path needs to be input, without the trailing slash symbol ("/"), ex: wss://central.system.com/ocpp16

After all necessary values are filled in, press the [Save] button. A confirmation notification of [Configuration Saved] in the top right corner should appear for a moment. For the settings to be applied, a reset of the Controller is required. Using the orange [Reset] button at the top right corner, next to language selection can be used to reboot the charger's main controller.

The CMC also allows direct view of the state of the [Connectors] of the charger, providing live feedback:

Connectors

1 CCS

Communication	Charger	Vehicle
State: Ready	Present voltage: 0.0 V	Requested voltage: -
Type: -	Present current: 0.0 A	Requested current: -
Vehicle: Not connected	Maximum voltage: 1000.0 V	Maximum voltage: -
	Maximum current: 180.0 A	SOC: -
	Maximum power: 180 kW	Vehicle ID: -

Current errors

Timestamp	Type	Code

An option to limit the output power of the whole charger or a single Connector is also available. Using local implementation of OCPP SmartCharging. This functionality proves useful when testing the charger prior to connecting it to OCPP Central System or if the Central System doesn't support OCPP Smart Charging. The applet for this is located in the [OCPP] section in [Smart Charging] and [Basic Smart Charging] tabs. Basic Smart Charging limits the overall output power for the whole charger, while the full Smart Charging tab allows setting profiles for selected connectors in greater detail. Refer to OCPP Smart Charging documentation on how to properly use it.

Troubleshooting

Problem: Unable to connect to the router/CMC.

Solution #1: Router not configured for self-commissioning (chargers built before 09.2024). Contact Service for assistance.

Solution #2: WAN connection - laptop's IP address not configured for the same network: set to static 192.168.10.50.

LAN connection - laptop's IP address set up Static not in the same network: set to automatic or to 192.168.14.50.

Problem: GSM connection not working.

Solution #1: Go to [STATUS] → [NETWORK] → [MOBILE] and verify if the SIM card is being detected. If [SIM Card state] is "Not inserted", verify if the SIM card is slotted into the right slot, check the SIM for damage, replace SIM.

Solution #2: Go to [STATUS] → [NETWORK] → [MOBILE] and verify if the SIM card is being detected. If [SIM Card state] is "Inserted", but [Data Connection State] is [Disconnected], check for errors in APN configuration.

Problem: GSM signal strength low.

Solution #1: Verify if GSM antenna is connected to the MAIN port on the router (MAIN GSM port is next to SIM2 slot).

Solution #2 Verify if GSM operator has sufficient service coverage in the area.

Problem: GSM APN connection configured, connected, but no connection to OCPP Central System.

Solution #1: Connecting to APN doesn't necessarily means that the connection to the Central System can be established. In some cases the APN is set up in a way that triggers security features on the router, most often the DNS rebind protection. Switching OFF the DNS [Rebind protection] in [NETWORK] → [DNS] → [General Settings] often helps.

Solution #2 Check OCPP configuration in the CMC for errors.

Problem: Static IP WAN connection not working - link state is [Down].

Solution: Check if physical network connection between router's WAN port and the network is not faulty (broken wiring, faulty plugs).

Problem: Static IP WAN connection not working - link state is [Up].

Solution: Check if IP configuration is correct. If correct, then try using router's PING (under [SYSTEM] → [Maintenance] → [Diagnostics]) to verify if the Gateway provided is reachable, if not, contact CPO's network administrator.

When everything fails - contact Ekoenergetyka-Service HelpDesk

E-mail: service@ekoenergetyka-service.com

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