



Alfen NG9xx series

Release notes version 6.0.0
EXTERNAL document

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1 Introduction

Firmware release **6.0.0** is a major release that includes a large number of improvements, added functionalities, and a new bootloader..

2 OCPP 2.0.1 improvements

Full support has been added for the following OCPP 2.0.1 profiles: core, local authorization, advanced security, reservation and smart charging. For advanced device management only the core functionalities reportBase; FullInventory and ConfigurationInventory are implemented. For advanced UI only tariff and costs related functionality are implemented.

NG9xx platform is now even more future proof and able to handle more functionalities than supported on OCPP 1.5 and 1.6.

Enabled the use of charging profiles in OCPP 2.0.1. While the messages were supported, it was not possible to actually use them before when the backoffice was configured with OCPP 2.0.1.

Changed certificate hashes according to OCPP1.6SE rev 3.

Added support for configuration key "MaxEnergyOnInvalidId". When a EV driver was authorized locally and a charging session has started, the EV driver will be granted a charge of MaxEnergyOnInvalidId Watthours when the back office system notifies the charging station during the charging session that the authorization is revoked. Prerequisite is that StopTxOnInvalidId is not set because that would immediately stop the transaction.

Fixed an issue where after presenting a masterpass to the NFC reader when there are no ongoing transactions, it appears that the NFC reader becomes inactive and does not detect any other NFC cards.

Fixed an issue where the transactioninfo is not shown with evdisconnect as stopreason.

Fixed an issue where no transactionevent start is sent with startpoint authorized if a cable is connected.).

Fixed an issue where the setChargingProfile request was unable to set TxProfile on all EVSE at once.

Fixed an issue when a setChargingProfileRequest was received with a NumberPhases different from the EVSE capabilities. This used to return a FormatViolation, which was incorrect since the number was allowed. Now the message is rejected properly.

Now report Energy.active.import as default measurand when no clock-aligned measurands are specified

Fixed an issue where the back office sends a UpdateLocalList(full) message and the charging station responded with a failed. The charging station reported that the idTagInfo was incorrect while that wasn't the case..

Fixed an issue where a CostUpdated request was handled with an invalid transactionId).

Fixed an issue where the charging station did not send StatusNotification(Reserved) when a specific connector is reserved).

Fixed an issue where the charging station responded with status "Accepted" on a ChangeAvailability request during a transaction, while status "Scheduled" is expected.).

Changed the replied boolean types in GetVariables to the correct capitalizations: True and False. This used to be all lowercase.).

Fixed an issue where the charging station rejected a TriggerMessage with requestedMessage MeterValues

Fixed an issue where the charging station did not recognize "transactionId" in a GetTransactionStatus request.

Fixed an issue where the TransactionEventRequest has a wrong triggerReason after a cable is plugged in while the idToken is presented first.

Fixed an issue where the charging station sends a transactionEventRequest with triggerReason Authorized instead of RemoteStart

Added 'reasons' to the command line to make it possible to set the start stop points.

BitMask order = , TX_ENERGY_TRANSFER, TX_POWER_PATH_CLOSED, TX_DATA_SIGNED, TX_AUTHORIZED, TX_EV_CONNECTED, TX_PARKING_BAY_OCCUPANCY

When starting a charging session with start reason TX_POWER_PATH_CLOSED, the charging station used to send a transaction event message with chargingstate charging while it was not yet charging, this has now been fixed.

Fixed an issue where the charging station sends a wrong TriggerReason during the TransactionEventRequest after a de-Authorization is done with an idToken. The triggerReason is "AbnormalCondition" instead of "StopAuthorized".

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Implemented the SetNetworkProfileRequest and NetworkConfigurationPriority configuration key. The OCPP 1.6 network related config key have changed The commandline network / APN command's has been replaced by the 'network' command (Highest prio is 1 and lowest is 4.)

Wired0 = ethernet

Wired1 = not used

Wired2 = not used

Wired3 = not used

Wireless0 = mobile network

Wireless1 = wifi (not supported yet)

Wireless2 = not used

Wireless3 = not used

3 New Bootloader

Due to this bootloader now being able to use an area in external flash instead of having to use half of its internal space, we have opened up the possibility to make use of more code flash. This frees up enough space to implement new features.

If a bootloader update is needed in the future, the chosen 2-stage approach makes this much easier than it currently is. A developer can extend the functionality of the second bootloader stage and push it as an update to the end user: they only see a regular FWI file which they can send using either the ASI or a backoffice.

Support for compressed FWI images has been added. This saves up to 35% in FWI size, ensuring lower data costs are incurred when updating over a mobile network.

Both stage 1 and 2 have version numbering. The previous bootloader was 0.1.6. Now the first digit represents the version of stage 1 and the latter two will represent the version number of stage 2. The first release will contain bootloader 1.2.0, so version 1 of stage 1 and version 2.0 of stage 2.

3.1 Minimal firmware

In order to update an existing pre-6.0.0 charging station to firmware versions 6.0.0 and above, a new bootloader is *mandatory*. Older bootloaders will not recognize firmware versions higher than 5.x. A special FWI package will be provided which updates both a CS' bootloader to 2 and firmware to 6.0.0, called a *minimal firmware*.

A minimal firmware package contains a new bootloader, as well as a heavily compressed 2-megabyte enabled firmware release which is unpacked after installing the new bootloader. This ensures that the user updates their bootloader and firmware in tandem, to prevent any incompatibilities between firmware versions of different sizes.

3.1.1 Bootloader update process

The bootloader update is a critical process, during which the system must not be powered off otherwise there is a risk that the system will not start.

4 Improvements

- The charging station can now read DSMR P1 smart meter data from a P1-to-network converter using the telnet protocol. Configuration items are added to select the P1 interface (serial or telnet) and set the telnet server properties (IP address and port). This is settable using OD's 2191_01, 2191_02 and 2191_03 .
- Implemented a method to recover from short voltage dips. This will log "Recover from short power outage" when executed.
- Add the option to use compressed firmware files, saving up to 35% on data usage.
- Repaired several networking related issues:
 - FTP firmware download flow
 - Networking profiles
 - Error handling for multipart content
 - Stop disconnecting webserver when mobile disconnects
- Add a backoff delay to modem network registration retries
- Add retries on loss of connection and a backoff delay to P1 over telnet
- Repair SIM PIN checking when set from backoffice)
- Add time zone support to ISO 6801 timestamp parser
- Make limiting current available to Service Installer app
- Stop modem when not in use to save power
- Add an error state when an NFC reader is not detected but is configured
- Improve handling of video resource FWI
- Fixed a timing issue that could in rare circumstances cause a reboot, mostly during the startup of the charging station.
- Charging profiles are invalidated instead of erased
- Improve string handling

5 Back-end communication changes

For OCPP 2.0.1 changes, see the related chapter. The device model allows the backoffice to extract the available configuration keys and their corresponding characteristics.

The following back-end communication changes relate to OCPP 1.5 and 1.6.

When a Boolean configuration key was set, the charging station assumed that everything that was (case insensitive) not 'true' as false. This has now been changed to only allow (case insensitive) true and false and otherwise reject the setting of the configurationkey.

The minimum length of tags has been reduced from 6 to 1, this has influence on tags in masterpass, remotestarttransaction and plug&charge ID's. Physical tags are unlikely to have a shorter length than 6, however in some cases the tags are not intended as physical tags, but are generated values.

Due to the implementation of setNetworkProfiles in OCPP 2.0.1, the related configuration keys in OCPP 1.5 and 1.6 are not functioning anymore.

Property	Description	Values	Access
Added			
MasterPassGroupId	IdTokens that have this id as groupId belong to the Master Pass Group. Meaning they can stop any ongoing transaction, but cannot start transactions. This can, for example, be used by law enforcement personal to stop any ongoing transaction when an EV has to be towed away	String[36]	Read / Write
MaxEnergyOnInvalidId	Maximum amount of energy in Wh delivered when an identifier is deauthorized by the CSMS after start of a transaction.	0 – 4294967295 Default: 0	Read / Write
Modified			
Removed			
ProtocolName			
ProtocolVersion			
BackOffice-Path-APN			
BackOffice-Path-wired			
BackOffice-Path-APN2			
BackOffice-Path-wired2			

BackOffice-URL-APN			
BackOffice-URL-wired			
WS timeout			
APN-Name			
APN-Password			
APN-User			
SecurityProfile			

6 Errorcode changes

No changes

7 Roll-out heads up

The bootloader update is part of the 6.0 FW update process. The bootloader update is a critical process, during which the system must not be powered off otherwise there is a risk that the system will not start.

8 Revision control

Date	Version	Description / status
2022-okt-3	1.0	Initial version
2022-okt-5	1.1	Update bootloader part
2022-okt-11	1.2	Processed comments
2023-jan-09	1.3	Add fixed issues for FW6 release
2023-jan-30	External	

9 Appendix A: Supported OCPP 2.0.1 use cases

A. Security

- A01 - Update Charging Station Password for HTTP Basic Authentication
- A02 - Update Charging Station Certificate by request of CSMS
- A03 - Update Charging Station Certificate initiated by the Charging Station
- A04 - Security Event Notification
- A05 - Upgrade Charging Station Security Profile

B. Provisioning

Booting a Charging Station

- B01 - Cold Boot Charging Station
- B02 - Cold Boot Charging Station - Pending
- B03 - Cold Boot Charging Station - Rejected
- B04 - Offline Behavior Idle Charging Station

Configuring a Charging Station

- B05 - Set Variables
- B06 - Get Variables
- B07 - Get Base Report
- B09 - Setting a new NetworkConnectionProfile
- B10 - Migrate to new ConnectionProfile

Resetting a Charging Station

- B11 - Reset - Without Ongoing Transaction
- B12 - Reset - With Ongoing Transaction

C. Authorization

Authorization options

- C01 - EV Driver Authorization using RFID
- C05 - Authorization for CSMS initiated transactions

GroupId

- C09 - Authorization by GroupId

Authorization Cache

- C10 - Store Authorization Data in the Authorization Cache
- C11 - Clear Authorization Data in Authorization Cache
- C12 - Start Transaction - Cached Id

Local Authorization list

- C13 - Offline Authorization through Local Authorization List
- C14 - Online Authorization through Local Authorization List

Offline Authorization

- C15 - Offline Authorization of unknown Id

Master pass

- C16 - Stop Transaction with a Master Pass

D. LocalAuthorizationList Management

- D01 - Send Local Authorization List
- D02 - Get Local List Version

E. Transactions

OCPD transaction mechanism

- E01 - Start Transaction Options
- E02 - Start Transaction - Cable Plugin First
- E03 - Start Transaction - IdToken First
- E04 - Transaction started while Charging Station is offline
- E05 - Start Transaction - Id not Accepted
- E06 - Stop Transaction options
- E07 - Transaction locally stopped by IdToken
- E08 - Transaction stopped while Charging Station is offline
- E09 - When cable disconnected on EV-side: Stop Transaction
- E10 - When cable disconnected on EV-side: Suspend Transaction
- E11 - Connection Loss During Transaction
- E12 - Inform CSMS of an Offline Occurred Transaction
- E13 - Transaction related message not accepted by CSMS
- E14 - Check transaction status

F. RemoteControl

Remote Transaction Control

- F01 - Remote Start Transaction - Cable Plugin in First
- F02 - Remote Start Transaction - Remote Start First
- F03 - Remote Stop Transaction

Unlock Connector

- F05 - Remotely Unlock Connector

Remote Trigger

- F06 - Trigger Message

G. Availability

- G01 - Status Notification
- G02 - Heartbeat
- G03 - Change Availability EVSE
- G04 - Change Availability Charging Station
- G05 - Lock Failure

H. Reservation

- H01 - Reservation
- H02 - Cancel Reservation
- H03 - Use a reserved Connector with GroupId
- H04 - Reservation Ended, not used

I. TariffAndCost

- I01 - Show EV Driver-specific Tariff Information
- I02 - Show EV Driver Running Total Cost During Charging
- I03 - Show EV Driver Final Total Cost After Charging
- I04 - Show Fallback Tariff Information
- I05 - Show Fallback Total Cost Message
- I06 - Update Tariff Information During Transaction

J. MeterValues

- J01 - Sending Meter Values not related to a transaction
- J02 - Sending transaction related Meter Values

K. SmartCharging

General Smart Charging

- K01 - SetChargingProfile
- K02 - Central Smart Charging
- K04 - Internal Load Balancing
- K05 - Remote Start Transaction with Charging Profile
- K06 - Offline Behavior Smart Charging During Transaction
- K07 - Offline Behavior Smart Charging at Start of Transaction
- K08 - Get Composite Schedule
- K09 - Get Charging Profiles
- K10 - Clear Charging Profile

External Charging Limit based Smart Charging

- K11 - Set / Update External Charging Limit for an ongoing transaction
- K12 - Reset / release external charging limit
- K13 - Set / update external charging limit (not on a transaction)

L. FirmwareManagement

- L01 - Secure Firmware Update

N. Diagnostics

Logging

- N01 - Retrieve Log Information

Monitoring Events

- N09 - Get Customer information
- N10 - Clear Customer information

P. DataTransfer

- P01 - Data Transfer to the Charging Station
- P02 - Data Transfer to the CSMS