The OCPP Driver

The OCPP driver connects to an Intesis Open Charge Point Protocol (OCPP) gateway. The driver performs the role of a Central System, providing user authentication and control to a single Charge Point or electric vehicle (EV) charger. Available for Commander and ObSys.

This document relates to OCPP driver version 1.0

Please read the *Commander Manual* or *ObSys Manual* alongside this document, available from *www.northbt.com*

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Compatibility with the OCPP System

The OCPP driver allows North to interface with an Intesis Open Charge Point Protocol (OCPP) gateway. The driver performs the role of a Central System, providing user authentication and control to a single Charge Point/electric vehicle (EV) charger.

The OCPP driver connects via the North Modbus driver to the OCPP gateway, which supports Modbus over TCP/IP (Fig. 1) or serial-line connections.

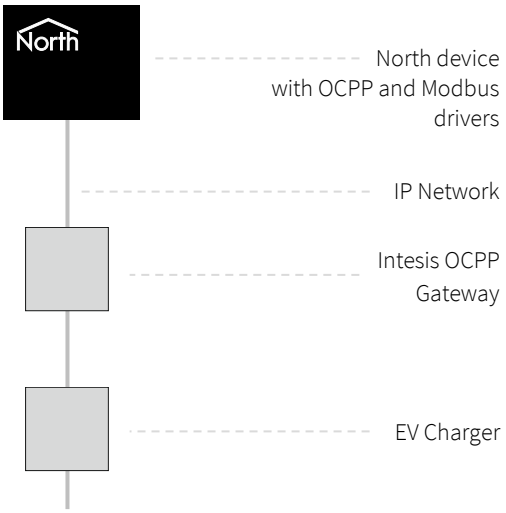

Fig. 1 North to Modbus

Equipment

Intesis OCPP to Modbus TCP & RTU Server Gateway is compatible with the driver, model INMBSOCP*xxx*0100.

The gateway supports OCPP 1.6, implementing OCPP-J (JSON) transport protocol specification.

The gateway was tested with an Autel MaxiCharger AC Wallbox EV charger, other OCPP-J 1.6 EV chargers should be compatible.

Values

The driver provides the following values:

- Remote start
- Remote stop
- Charger status
- Charger error
- Last charge energy used
- Last charge duration
- Last charge stop reason

The driver can generate alarms when starting and stopping charging.

Prerequisites

The OCPP driver operation requires access to the Modbus driver, configured as either a Modbus TCP client or Modbus serial client.

Configure the EV charger with OCPP Server location set to ‘ws://*<IP address of gateway>*:9000/*<chargerID>*’.

The OCPP gateway requires configuring using Intesis MAPS software. Set Modbus Type to ‘RTU + TCP’ and Byte Order to ‘Big endian’. Set OCPP Type to ‘BMS Central System’. Scan the OCPP network and assign Charger 1 Connector 1 to the connected EV charger (configure the EV charger first).

An OCPP gateway with firmware v1.0.3.0 has been verified as compatible with this driver.

Driver Operation

The OCPP driver connects via the North Modbus driver to the OCPP gateway. The driver performs the role of a Central System, providing several operations to control to a single EV charger.

Request start charge

On writing the value ‘start’ to the Action Task (A.T) object from the OCPP System, the driver checks the EV charger state. If the charger is in a ‘preparing’ state, i.e. charging cable is connected, then the driver generates an idTag and sends a remote start transaction to the OCPP gateway.

If the charger is not in a ‘preparing’ state, then the object write is rejected.

Authorize

Before an electric vehicle can start or stop charging, the EV charger has to authorize the operation. An authorize request contains a user’s idTag – this could be from the remote start transaction above, or a local RFID card.

The driver polls the gateway for a pending authorize transaction. Upon receipt of an authorize, the driver responds indicating if the idTag is accepted or rejected.

The driver only accepts an idTag generated during a Request Start Charge operation. Any other idTag will be rejected.

Start

The driver polls the gateway for a pending start transaction. Upon receipt of a start, the driver records the start meter reading, validates the idTag again, and responds with a transactionID.

The driver sets its Charging Started object (C.S) to ‘Yes’, and starts the charging duration timer.

The EV charger starts charging the vehicle.

Request stop charge

On writing the value ‘stop’ to the Action Task (A.T) object from the OCPP System, the driver sends a remote stop transaction containing the last transactionID to the OCPP gateway.

Stop

The EV charger stops charging the vehicle when it receives a remote stop transaction, local user action, or error. On stopping it sends a stop transaction.

The driver polls the gateway for a pending stop transaction. Upon receipt of a stop, the driver records the stop meter reading and stop reason.

The driver sets its Charging Started object (C.S) to ‘No’, and updates the Last Charge (L) and Today’s Use (T) objects.

Using the Driver

On ObSys and Commander, the OCPP driver is available to download and install onto the device. Once started, you will need to set up the driver before it can communicate with the OCPP gateway.

Starting the Interface

To start an interface using the OCPP driver, follow these steps:

- → **Start Engineering** your North device using ObSys
- → Navigate to **Configuration, Interfaces,** and set an unused **Interface** to 'OCPP' to start the particular interface. If not already started, set another unused **Interface** to 'Modbus'
- → Navigate to the top-level of your North device and re-scan it

The driver setup object (Mc), labelled **OCPP Setup**, should now be available. If this object is not available, check an interface licence is available and the driver is installed.

Setting up the Driver

To set up the driver, follow these steps:

- → Navigate to the **OCPP Setup** object (M*c*). For example, if you started interface 1 with the driver earlier, then the object reference will be 'M1'
- → Set the **Modbus Object Reference** to the OCPP gateway device. For example, if you started interface 2 with the Modbus driver, in Modbus TCP Client Setup set TCP Unit 1 with the IP address of the OCPP gateway, then the object reference will be 'S2.U1'.

Checking Communications

You can check that the interface is communicating by reading the **Comms Online** object (DS). A value of 'Yes' indicates the driver is communicating with the OCPP gateway via Modbus.

The **Monitor – Charger Status** system object (M.S) also provides the current status of the EV charger.

Alarms

When charging is started or stopped the OCPP driver sends an alarm.

Format

North-format alarms contain six text fields. The Meter driver places the following information into these fields:

System – copied from System Label object (DL) within driver setup

Point – 'Charging start' or 'Charging stop (0.*xxx*kWh)', with energy use included

Condition – user's name or 'Unknown'

Priority – '4'

Date & Time – from North device

Examples

System	Point	Condition	Priority	Date	Time
OCPP	Charging start	User A	4	19/06/23	14:22:00
OCPP	Charging stop (0.123kWh)	User A	4	19/06/23	15:31:25

Object Specifications

Once an interface is started, one or more extra objects become available within the top-level object of the device. As with all North objects, each of these extra objects may contain sub-objects, (and each of these may contain sub-objects, and so on) - the whole object structure being a multi-layer hierarchy. It is possible to navigate around the objects using the ObSys Engineering Software.

Each object is specified below, along with its sub-objects.

Device Top-Level Objects

When an interface is started using the OCPP driver, the objects below become available within the top-level object of the device. For example, if interface 1 is started, then the object reference 'M1' becomes available.

Description	Reference	Type
OCPP Setup Set up the OCPP driver, started on interface *c* (*c* is the interface number)	M*c*	Fixed Container: On the Commander platform this will be *[CDM v20\OCPP v10]* On the ObSys platform this will be *[OSM v20\OCPP v10]*
OCPP Access OCCP system connected to interface *c*	S*c*	Fixed Container *[OCPP v10]*

OCPP Driver Setup

Object Type: *[OSM v20\OCPP v10]*
Object Type: *[CDM v20\OCPP v10]*

The OCPP Driver Setup contains the following objects:

Description	Reference	Type
System Label Label displayed when scanning the system and within alarms	DL	Obj\Text; Max Length 20; Adjustable
Enabled Enable OCPP operation	E	Obj\NoYes; Adjustable
Modbus Object Reference Object reference of Modbus OCPP gateway	RP	Obj\Obj; Adjustable
Read rate (s) Time to wait between poll operations	RR	Obj\Num: 1…300; Adjustable
Comms Online Indicates whether communication is established with the Modbus gateway	DS	Obj\NoYes
Reset Counters Reset forever use values	RC	Obj\NoYes; Adjustable

OCPP

Object Type: *[OCPP v10]*

OCPP contains the following objects:

Description	Reference	Type
Action Start or stop charging	A	Fixed Container *[OCPP v10\Action]*
Monitor Charger status from OCPP gateway	M	Fixed Container *[OCPP v10\Monitor]*
Charging Session Information on active charging session	C	Fixed Container *[OCPP v10\Charging]*
Last Charge Information on last charging session	L	Fixed Container *[OCPP v10\Last]*
Today's Use Information on today's charging	T	Fixed Container *[OCPP v10\Use]*
Previous Day's Use Information on previous day's charging	P	Fixed Container *[OCPP v10\Use]*
Total Use Information on all charging sessions, since counters last reset	F	Fixed Container *[OCPP v10\Use]*

Action

Object Type: *[OCPP v10\Action]*

The Action object allows charging to be started or stopped remotely.

Description	Reference	Type
User Optional user name to set before writing to Task (T)	U	Obj\Text; 120 chars; Adjustable-only
Task Start or stop charging. To start charging, the Monitor Charger Status object (M.S) must be 'preparing'. Unlock is used when the EV driver has a problem unplugging the cable due to malfunction.	T	Obj\Enum; Adjustable-only 0=None, 1=Start, 2=Stop, 3=Unlock
Task & User Set both Task and User in one operation	TU	Obj\Text;120 chars; Adjustable-only Format: <task>|<user>
Reset Reset the OCPP gateway or EV charger	RST	Obj\ENum; Adjustable 0=None, 1=Clear gateway registers, 2=Clear EV authorization cache, 3=Reset EV

Monitor

Object Type: *[OCPP v10\Monitor]*

The Monitor object monitors the current status of the charger from the OCPP gateway. Charger status has the following meaning:

- Available – not in-use, cable removed
- Preparing – cable connected, ready for start charge action
- Charging – authorised and charging started
- Suspended EV – authorised but EV has not started charging
- Suspended EVSE – authorised but the EV supply equipment does not allow charging
- Finishing – charging stopped, but cable still connected
- Reserved – charger reserved for user (not implemented)
- Unavailable – availability message received, setting connector to unavailable (not implemented)
- Fault – fault detected that prevents further charging operation.

OCPP Monitor contains the following objects:

Description	Reference	Type
Charger Status Current status of the charger from the OCPP gateway	S	Obj\ENum 0=Available, 1=Preparing, 2=Charging, 3=Suspended EV, 4=Suspended EVSE, 5=Finishing, 6=Reserved, 7=Unavailable, 8=Fault
Charger Error When Charger Status is 'Fault', this object provides a description of that fault	E	Obj\ENum 0=Connector lock failure, 1=EV communication error, 2=Ground failure, 3=High temperature, 4=Internal error, 5=Local list conflict, 6=No error, 7=Other error, 8=Over current failure, 9=Over voltage, 10=Power meter failure, 11=Power switch failure, 12=Reader failure, 13=Reset failure, 14=Under voltage, 15=Weak signal

Charging Session

Object Type: *[OCPP v10\Charging]*

The Charging Session object contains information about the current charging activity.

Description	Reference	Type
Started Driver has received a start message from the OCPP gateway	S	Obj\NoYes
Duration (mins) Driver generated counter of minutes since receiving a start message	D	Obj\Num
User Username supplied in the action object	U	Obj\Text: 120 chars

Last Charge

Object Type: *[OCPP v10\Last]*

The Last Charge object contains information about the last completed charging session.

Note the Today's Use Total Session Count (T.C) object will increment when a charging session is completed.

Description	Reference	Type
Start Time Driver recorded date and time when charging session started	T	Obj\DateTime
User Username supplied in the action object	U	Obj\Text: 120 chars
Energy (kWh) Calculated energy use	E	Obj\Float
Duration (mins) Driver generated count of total minutes charging	D	Obj\Num
Stop Reason Reason charging stopped, if available. Typically this is set to 'Remote' when stopped via the driver, or 'Local' from the EV charger.	R	Obj\ENum 0=De-authorized, 1=Emergency stop, 2=EV disconnected, 3=Hard reset, 4=Local, 5=Other, 6=Power loss, 7=Reboot, 8=Remote, 9=Soft reset, 10=Unlock command
Counter Change-of-value counter indicating the last charge information has updated. The value is 0 on initialisation, then changes to 1…65535 indicating information updated	C	Obj\Num: 0, 1…65535

Use

Object Type: *[OCPP v10\Use]*

The Use object provides either today's or previous day's usage information.

Description	Reference	Type
Total Session Count Total number of authorized charging sessions this period	C	Obj\Num: 0…65535
Energy (kWh) Total energy use this period	E	Obj\Float
Duration (mins) Total minutes charging use for this period	D	Obj\Num: 0…65535

Driver Versions

Version	Build Date	Details
1.0	25/06/2024	Driver released

Next Steps…

If you require help, contact support on 01273 694422 or visit *www.northbt.com/support*

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Document issued 04/02/2025.