KeContact

P30

Charging Station

UDP Programmers Guide V 2.05

Original manual



KEBA

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1 Introduction

1.1 Safety instructions

This document is an extension to the supplied manuals of P30.

You must comply with all instructions and safety instructions in the supplied manuals!

1.2 Verification of validity

The user must ensure that this document is valid for his present product.

1.3 Target group

This document contains information for people with the relevant technical knowledge and programming skills in the applicable area and appropriate to the operations they are required to perform.

1.4 Requirements

The following requirements have to be met in order to use the UDP functionality:

- **KeContact P30 c-series** or **x-series**
  with firmware version **3.9.24** or higher
- For the majority of UDP commands, the DIP switch DSW1.3 has to be set to "ON" (for details regarding the DIP switches, see the "installation manual"). Exceptions are described in the commands section.
- A PC or smartphone for sending the UDP commands.
  This also requires a suitable UDP client software or UDP app.
- The charging station has to be connected (via LAN cable or WLAN) to the same network as the application.
- The UDP interface must not be used together with the Modbus TCP interface and vice versa.

Information

The latest manuals and firmware can be downloaded here:
www.keba.com/emobility-downloads

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1.5 IP addresses in the network

For charging stations of type P30 c-series , communication is only permitted within a local network. Therefore, incoming and outgoing data traffic is only possible within the following network ranges. This must be taken into account when assigning an IP address to the charging station.

Network areas	Allowed IP addresses
192.168.0.0/16 [RFC 1918]	192.168.0.0 ….. 192.168.255.255
172.16.0.0/12 [RFC 1918]	172.16.0.0 ….. 172.31.255.255
10.0.0.0/8 [RFC 1918]	10.0.0.0 ….. 10.255.255.255
169.254.0.0/16 — Link Local Range [RFC 3927]	169.254.0.0 ….. 169.254.255.255
255.255.255.255 — Limited Broadcast [RFC 0919]	-
0.0.0.0 — Initial Connection Settings [RFC 1122]	-

1.6 Legal disclaimer

Specifications are subject to change due to further technical developments. Details presented may be subject to correction.

This program guide applies exclusively to KEBA KeContact P30 c-series or x-series with firmware version 3.9.24 or higher.

It is possible that the present program guide still has printing defects or printing errors. However, the information in this program guide will be checked regularly and corrections will be made in the next edition.

Liability claims against KEBA relating to material or immaterial damage caused by the use or non-use of the information contained in the program guide or by the use of incorrect or incomplete information are excluded. KEBA shall only be liable for intent and gross negligence as well as for injury to life, body or health as well as for violation of essential contractual obligations.

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Each integrator is responsible for updating and maintaining the applicable system. There are no legal claims and/or liability claims for failure of systems due to non-updated UDP scripts.

1.7 Further documentation and software

Manuals, further information and software downloads are available on the KEBA website:

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2 Overview

This programmers guide provides the information required to develop an application for sending UDP commands to P30 charging station. UDP commands can be used to get status information from the charging station or to control the charging station with a UDP client (PC software or smartphone app).

Using UDP, the charging station can be integrated into a smart home, which allows for example, the current power consumption to be regulated in response to a photovoltaic system.

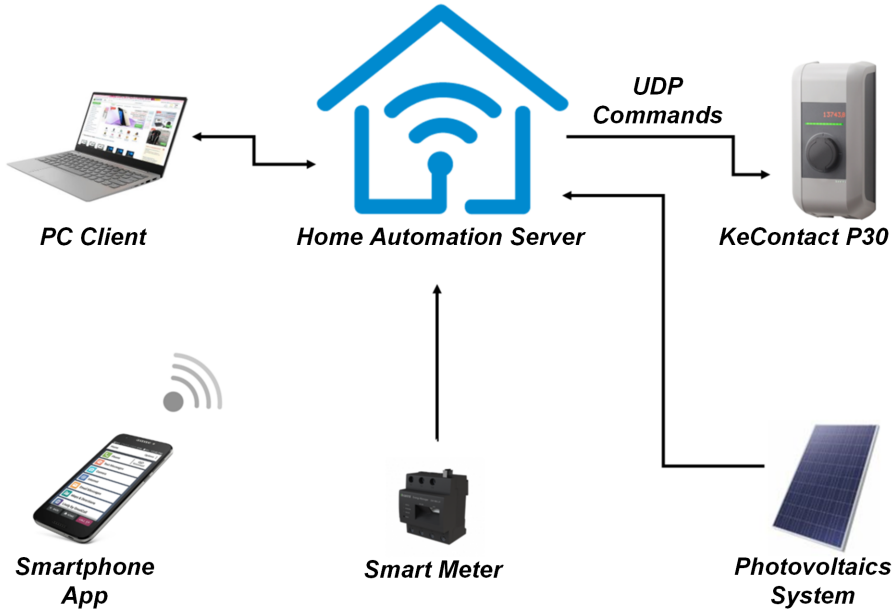


Fig. 2-1: Schematic overview (example)

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3 UDP interface: Guidelines

The following section contains rules and guidelines to ensure the best usability.

3.1 Required command delays

The following time intervals are the minimum required waiting times between UDP commands in general and the scheduled repetition of the same command. Any application communicating with P30 is required to comply with these waiting times.

The minimum waiting time between any two UDP commands is defined as follows:

- t_UDP_pause = 100 ms

The minimum waiting time between the scheduled repetitions of any UPD command is defined as follows:

- t_COM_pause = 5 s

The minimum waiting time after sending a disable command (e.g. `ena 0`) is defined as follows:

- t_DIS_pause = 2 s

3.2 Addressing and communication port

Always use direct addressing for communication. This means that each command or UDP session has to contain the IP address of the specific charging station.

The port used for UDP communication is 7090. Ensure that this port is not blocked by a firewall or other ongoing communication.

Information

Do not communicate with a charging station without addressing it by its IP address. Even if it seems to work fine in some cases, this practice is dangerous for multiple stations in the same network. This feature will be discontinued.

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3.3 Recommended communication buildup scheme

The following scheme illustrates a recommended process for the detection and the initial communication buildup:

1) Send “`i`” to network address/port 7090
2) Wait for t_UDP_pause

   If a device sends a response, continue with step 3 otherwise return to step 1.

3) Send “`report 1`” to IP address of charging station/port 7090
4) Wait for t_UDP_pause
5) Send “`report 2`” to IP address of charging station/port 7090
6) Wait for t_UDP_pause
7) Send “`report 3`” to IP address of charging station/port 7090
8) Wait for t_UDP_pause

Now the complete device data and all acquirable information is available to the application.

3.4 RFID authorization

The following section provides information regarding the RFID authorization function as well as a method to detect if this function is enabled.

All variants of the KeContact charging stations save the RFID tags in a whitelist, which can be deleted by performing a special reset or extended by using the master RFID card. For more information please refer to the "operating instructions".

3.4.1 P30 c-series

P30 c-series has no dedicated setting to enable/disable the RFID authorization. A charging station with an empty whitelist is permanently unlocked and a charging station with at least one entry in the whitelist is locked. The data shown in the following table can be acquired using the command `report 2`.

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Whitelist	Operating status	State	Plug	AuthON	Authreq
Empty	idle	1	3	0	0
Empty	plugged but not charging	2	7	0	0
Empty	charging	3	7	0	0
Not empty	idle and locked	1	3	1	1
Not empty	unlocked and not charging	1	3	1	0
Not empty	unlocked and plugged but not charging	2	7	1	0
Not empty	unlocked and charging	3	7	1	0

The following can be concluded for all device types listed as P30 c-series: If the field “AuthON” is set to “0”, then the authorization function is disabled.

3.4.2 P30 x-series

P30 x-series features a web interface with a dedicated setting for the authorization function. This function is governed by an additional circuit board called “COM-module” which also houses the WiFi components. The RFID authorization can be deactivated even though the whitelist of the charging station is not empty.

P30 x-series will behave like P30 c-series after a restart until the COM-module is ready (~ 5 min after restart). The data shown in the following table can be acquired using the command `report 2`.

Whitelist	Operating status	State	Plug	AuthON	Authreq
Empty	idle	1	3	0	0
Empty	plugged but not charging	2	7	0	0
Empty	charging	3	7	0	0
Empty	idle and locked (cannot be unlocked since whitelist is empty)	1	3	1	1
Not empty	idle	1	3	0	0
Not empty	plugged but not charging	2	7	0	0
Not empty	charging	3	7	0	0
Not empty	idle and locked	1	3	1	1
Not empty	unlocked and not plugged	1	3	1	0
Not empty	unlocked and plugged but not charging	2	7	1	0
Not empty	unlocked and charging	3	7	1	0

The following can be concluded for all device types listed as P30 x-series: If the field “AuthON” is set to “0”, then the authorization function is disabled.

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3.5 Current control

Please note that AC (alternating current) charging stations do not control/change the charging current directly. AC charging stations use a PWM (pulse width modulation) signal to communicate the maximum allowed charging current to the vehicle as specified in IEC 61851-1. All P30 are AC charging stations. The actual current is solely controlled by the vehicle. If the wording used in this document indicates a current change, the actual meaning is always a change in the maximum allowable current (target current) communicated to the vehicle.

P30 complies with IEC 61851-1. This international standard requires a minimum waiting time between two consecutive current changes. To fulfill this requirement, all P30 will delay the execution of UDP commands requesting a current change during a charging session. The affected commands are `currtime` and `curr`. The request to stop charging via `currtime 0 1` will not be delayed and executed as soon as possible.

When a command, either `currtime` or `curr`, sets a new value for “Curr user” the device prepares to change the target current within the next 6-7 seconds. If another current change is requested via UDP command during this period of time the target current will be overwritten but the timer will not reset. The following examples illustrate the system behavior:

Example 1

```
TCH-> curr 16000
0170 : 30.05.2017 10:07:19 : 192.168.2.100 : TCH-OK :done

TCH-> 0171 : 30.05.2017 10:07:25 : 192.168.2.100 : {"Max curr": 16000}
```

10:07:19	`curr` command changes the value of “Curr user” immediately.
10:07:19	Internal timer starts at the same moment.
10:07:25	The change in the target current is executed and the value of “Max curr” is changed.

Example 2

```
TCH-> currtime 18000 1
0083 : 30.05.2017 09:46:09 : 192.168.2.100 : TCH-OK :done

TCH-> currtime 24000 1
0084 : 30.05.2017 09:46:11 : 192.168.2.100 : TCH-OK :done

TCH-> 0085 : 30.05.2017 09:46:16 : 192.168.2.100 : {"Max curr": 24000}
```

09:46:09	The first `currtime` command initiates a change of the target current.
09:46:10	The field “Curr user” is updated and the internal timer starts.
09:46:11	The second `currtime` requests another current adaptation.
09:46:12	The field “Curr user” is updated again but the internal timer is already running.
09:46:16	The change in the target current is executed and the value of “Max curr” is changed to the value sent by the last command.

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4 UDP commands

4.1 General information

Information

When using UDP commands it is strongly recommended to protect your network to prevent unauthorized control.

The following section will cover all available UDP commands and categorize them appropriately into commands meant for regular use and commands with specific use cases.

The charging station reacts on broadcasts (not valid for KeContact P30 x-series) and directly addressed commands. In a group of several charging stations, direct addressing must be used because otherwise all charging stations would react.

The commands are sent to the charging station as simple text commands (without end characters such as <CR> or <LF>). The replies come as data packages with up to 512 bytes and are formatted in JSON standard.

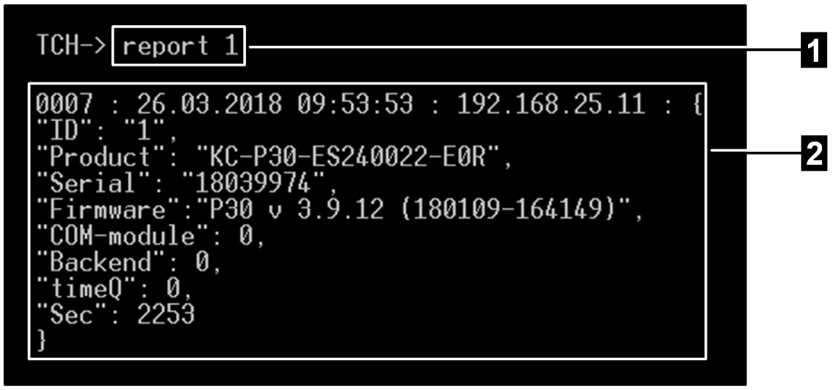


Fig. 4-2: *Example of a UDP command and the reply from the charging station*

1 ... UDP command 2 ... Reply

Information

UDP does not support error correction functionality. Please verify the effect of the sent commands yourself.

Port information:

- Send port = UDP 7090
- Receive port = UDP 7090

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4.2 UDP commands intended for regular use

The following section contains all UDP commands meant for regular use. These commands are used to gain information about the current state of the device as well as to control the next or the current charging session. All settings caused by these commands are not permanent and are reset at the next time the device registers that the EV plug is pulled from a vehicle inlet or the charging station is restarted.

4.2.1 UDP command: i

This command will deliver basic information about the addressed charging station. Each communication buildup should be done by using "`i`".

This command works also without DSW1.3 being set to "ON".

Command structure

Command	Parameters	Additional Description
`i`	-	-

Reply structure

Field	Contents	Additional Description
Firmware	String (32 chars)	Firmware version of the device

4.2.2 UDP command: report 1

If the IP address in the network is known, the use of `report 1` as a unicast is recommended. It delivers more information as `i`, but is not designed to be used as a broadcast to search for P30 charging stations in the network.

This command works also without DSW1.3 being set to "ON".

Command structure

Command	Parameters	Additional Description
`report 1`	-	-

Reply structure

Field	Contents	Additional Description
ID	1	ID of the report
Product	String (32 chars)	Product name as defined by the manufacturer
Serial	String (8 chars)	Serial number of the device
Firmware	String (32 chars)	Firmware version of the device
COM-module	0	No communication module is present.
	1	Communication module is present.
Backend	0	No backend communication is present.
	1	Backend communication is present.

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Field	Contents	Additional Description
timeQ	0	No time quality. Clock was never set. UC_TQ_NONE = 0 (for more information see “setdatetime”).
	1	Clock was set but not really synchronized e.g. build time was used. UC_TQ_NOT_SYNCED = 1 (for more information see “setdatetime”).
	2	Clock was synchronized using an unreliable source. UC_TQ_WEAK = 2 (for more information see “setdatetime”).
	3	Clock was synchronized using a reliable source (NTP, OCPP, etc.). UC_TQ_STRONG = 3 (for more information see “setdatetime”).
Sec	uint32	Current state of the system clock in seconds from the last startup of the device.

4.2.3 UDP command: report 2

Command structure

Command	Parameters	Additional Description
`report 2`	-	-

Reply structure

Field	Contents	Additional Description
ID	2	ID of the report
State	0	Startup
	1	Not ready for charging Charging station is not connected to a vehicle, is locked by the authorization function or another mechanism.
	2	Ready for charging and waiting for reaction from vehicle.
	3	Charging
	4	Error is present
	5	Charging process temporarily interrupted because temperature is too high or any other voter denies.
Error1	uint16	Decimal number defining the error
Error2	uint16	Decimal number defining the error

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Field	Contents	Additional Description
Plug	0	No cable is plugged.
	1	Cable is plugged into charging station.
	3	Cable is plugged into charging station and locked. This is the default idle state for all devices with permanently attached cable.
	5	Cable is plugged into charging station and vehicle but not locked.
	7	Cable is plugged into charging station and vehicle, furthermore the cable is locked. Charging is not possible until plug state “7” is reached.
AuthON	0	Authorization function is deactivated.
	1	Authorization function is activated.
Authreq	0	Authorization via RFID card is not required. OR The authorization via RFID card was already performed.
	1	Authorization via RFID card is required.
Enable sys	0	Charging state cannot be enabled.
	1	Charging state can be enabled.
Enable user	0	Device is disabled (e.g. via “ena 0”).
	1	Device is enabled.
Max curr	uint16 Possible values: 0; 6000 - 32000	Current value in mA offered to the vehicle via control pilot signalization. (Signal type: PWM)
Max curr %	uint16 Possible values: 100 - 533; 1000	Duty cycle of the control pilot signal. The unit displayed is not % but 0.1%, which means that the value “1000” stands for a duty cycle of 100%. For more information concerning the control pilot refer to IEC 61851-1.
Curr HW	uint16 Possible values: 0; 6000 - 32000	Maximum current value in mA that can be supported by the hardware of the device. This value represents the minimum of the DIP switch settings, cable coding and temperature monitoring function.
Curr user	uint16 Possible values: 0; 6000 - 63000	Current setting in mA defined via UDP current commands. (Default: 63000 mA)
Curr FS	uint16 Possible values: 0; 6000 - 63000	Current setting in mA defined via `failsafe` function.
Tmo FS	uint16 Possible values: 0; 10 - 600	Communication timeout in seconds before triggering the Failsafe function.
Curr timer	uint16 Possible values: 0; 6000 - 63000	Current value in mA that will replace the setting in the “Curr user” field as soon as “Tmo CT” expires.
Tmo CT	uint32 Possible values: 0; 1 - 860400	Timeout in seconds before the current setting defined by the last `currtime` command will be applied.

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Field	Contents	Additional Description
Setenergy	uint32 Possible values: 0; 1 - 999999999	Energy value in 0.1 Wh defined by the last `setenergy` command (`setenergy 100000` specifies 10 kWh). Max. value is 99999999.9 Wh (higher values will cause a counter overflow).
Output	uint32 Possible values: 0; 1; 10 - 150	Show the setting of the UDP command `output`.
Input	0; 1	State of the input X1; For further information concerning the input X1, see the "installation manual".
Serial	String (8 chars)	Serial number of the device.
Sec	uint32	Current state of the system clock in seconds from the last startup of the device.
X2 phaseSwitch source	uint16	Specified communication channel of x2
X2 phaseSwitch	uint16	Used phases by external phase switch

4.2.4 UDP command: report 3

Command structure

Command	Parameters	Additional Description
`report 3`	-	-

Reply structure

Field	Contents	Additional Description
ID	3	ID of the report
U1	int (3 digits)	Measured voltage value on phase 1 in V
U2	int (3 digits)	Measured voltage value on phase 2 in V
U3	int (3 digits)	Measured voltage value on phase 3 in V
I1	int (5 digits)	Measured current value on phase 1 in mA
I2	int (5 digits)	Measured current value on phase 2 in mA
I3	int (5 digits)	Measured current value on phase 3 in mA
P	uint32 (8 digits)	Power in mW (effective power).
PF	int (4 digits) Possible values: 0 - 1000	Current power factor (cosphi). The unit displayed is not % but 0.1%.
E pres	uint32 Possible values: 0 - 999999999	Energy transferred in the current charging session in 0.1 Wh. This value is reset at the beginning of a new charging session. Max. value is 99999999.9 Wh (higher values will cause a counter overflow).
E total	uint32 Possible values: 0 - 999999999	Total energy consumption (persistent, device related) in 0.1 Wh. Max. value is 99999999.9 Wh (higher values will cause a counter overflow).
Serial	String (8 chars)	Serial number of the device

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Field	Contents	Additional Description
Sec	uint32	Current state of the system clock in seconds from the last startup of the device.

Example

• Charging station is not connected to a vehicle.	• Vehicle is charging.

```
TCH-> report 3
0053 : 26.03.2018 10:45:35 : 192.168.25.11 : {
"ID": "3",
"U1": 0,
"U2": 0,
"U3": 0,
"I1": 0,
"I2": 0,
"I3": 0,
"P": 0,
"PF": 0,
"E pres": 0,
"E total": 0,
"Serial": "18039974",
"Sec": 1255
}
```

```
TCH-> report 3
0069 : 26.03.2018 10:50:21 : 192.168.25.11 : {
"ID": "3",
"U1": 228,
"U2": 2,
"U3": 2,
"I1": 10,
"I2": 0,
"I3": 0,
"P": 526,
"PF": 218,
"E pres": 0,
"E total": 0,
"Serial": "18039974",
"Sec": 1541
}
```

4.2.5 UDP command: report 1xx (historical log entries)

With the commands `report 101` up to `report 130` you can read the history of the last 30 charging sessions. `report 100` shows the latest charging session. After a reboot, the report will deliver all zero values. If a new session is started by plugging in the vehicle, a new Session ID is created in `report 100` and all the available values (start time, start energy value, RFID token code) are filled. If the session ends, the end values (end time and end reason) will also be added, and `report 100` is shifted to `report 101`.

Command structure

Command	Parameters	Additional Description
`report 100`	-	-

Reply structure

Field	Contents	Additional Description
ID	100	ID of the report
Session ID	uint32	ID of the current charging session. This value will be assigned automatically and is not resettable. This value is incremented session by session. Due to the high maximum value (over 4 billion possible IDs), the session ID can be considered unique.
Curr HW	uint16 Possible values: 0; 6000 - 32000	Maximum current value in mA that can be supported by the hardware of the device. This value represents the minimum of the DIP switch settings, cable coding and temperature monitoring function.
E start	uint32 Possible values: 0 - 999999999	Total energy consumption (persistent, device related) without the current charging session in 0.1 Wh at the beginning of the charging session. Max. value is 99999999.9 Wh (higher values will cause a counter overflow).

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Field	Contents	Additional Description
E pres	uint32 Possible values: 0 - 999999999	Energy transferred in the current charging session in 0.1 Wh. This value is reset at the beginning of a new charging session. Max. value is 99999999.9 Wh (higher values will cause a counter overflow).
started[s]	uint32	State of the system clock in seconds from the last startup of the device at the start of the charging session.
ended[s]	uint32	State of the system clock in seconds from the last startup of the device at the end of the charging session.
started	YYYY-MM-DD hh:mm:ss.000 string (23 chars)	If the device cannot access an NTP time server, this field will contain the same data as “started[s]” or set with “setdatetime”.
ended	YYYY-MM-DD hh:mm:ss.000 string (23 chars)	If the device cannot access an NTP time server, this field will contain the same data as “ended[s]”. If the device can access the internet, it will try to reach an NTP time server. This date stamp will represent the current time in UTC at the end of the charging session.
reason	0	Charging session has not ended.
	1	Charging session was terminated by unplugging.
	10	Charging session was terminated via deauthorization with the RFID card used for starting the session.
timeQ	0	Not synced time (for more information see “setdatetime”).
	X	Strong synced time (for more information see “setdatetime”).
	2	Weak synced time (for more information see “setdatetime”).
RFID tag	000000000000… String (20 chars)	RFID Token ID if session started with RFID. First character is the lowest nibble.
RFID class	000000000000… String (20 chars)	If all digits are “0”, then no RFID card was used to start the charging session (authorization is set to “OFF”).
Serial	String (8 chars)	Serial number of the device
Sec	uint32	Current state of the system clock in seconds from the last startup of the device

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Example

- Vehicle is charging.
- `report 100` and `report 101` will contain the same information until a new session is started.

```
TCH-> report 100
0159 : 26.03.2018 13:31:08 : 192.168.25.11 : {
"ID": "100",
"Session ID": 13,
"Curr HW": 10000,
"E start": 0,
"E pres": 0,
"started[s]": 2107,
"ended[s]": 2334,
"started": "2107000",
"ended": "2334000",
"reason": 1,
"timeQ": 0,
"RFID tag": "0000000000000000",
"RFID class": "00000000000000000000",
"Serial": "18039974",
"Sec": 2915
}
```

```
TCH-> report 101
0160 : 26.03.2018 13:32:37 : 192.168.25.11 : {
"ID": "101",
"Session ID": 13,
"Curr HW": 10000,
"E start": 0,
"E pres": 0,
"started[s]": 2107,
"ended[s]": 2334,
"started": "2107000",
"ended": "2334000",
"reason": 1,
"timeQ": 0,
"RFID tag": "0000000000000000",
"RFID class": "00000000000000000000",
"Serial": "18039974",
"Sec": 3003
}
```

4.2.6 UDP command: currtime

The command `currtime` can be used to control the charging current at any time. The setting will be active after the delay specified by the “t” parameter (e.g. the command `currtime 12000 20` will change the field “Curr user” to 12 A after 20 s). All changes caused by `currtime` are not permanent and will be reset at the next time the charging station registers that the vehicle plug is pulled from a vehicle inlet or the charging station. The changes can be displayed with the command `report 2`.

- `currtime 0 1`: This command issues a charging stop similar to `ena 0`. The charging station will display a blue main LED bar. Charging will be refused until the setting is overwritten by a new `currtime` command or one of the aforementioned reset conditions is met. The execution of this command will take approximately 1 second. If `currtime 0 1` is used, then no other command should be sent for 2 seconds to ensure an undisturbed execution of the disable command.
- `currtime 0 0`: This command nullifies a previously issued `currtime` as long as the timer is still running

Command structure

Command	Parameters	Additional Description
`currtime [c] [t]`	[c]: Current setting	Current value in mA. Possible values: 0; 6000 - 63000
	[t]: Time delay	Timeout in seconds before the current will be applied. Possible values: 0; 1 - 860400 Values higher than 860400 will be discarded.

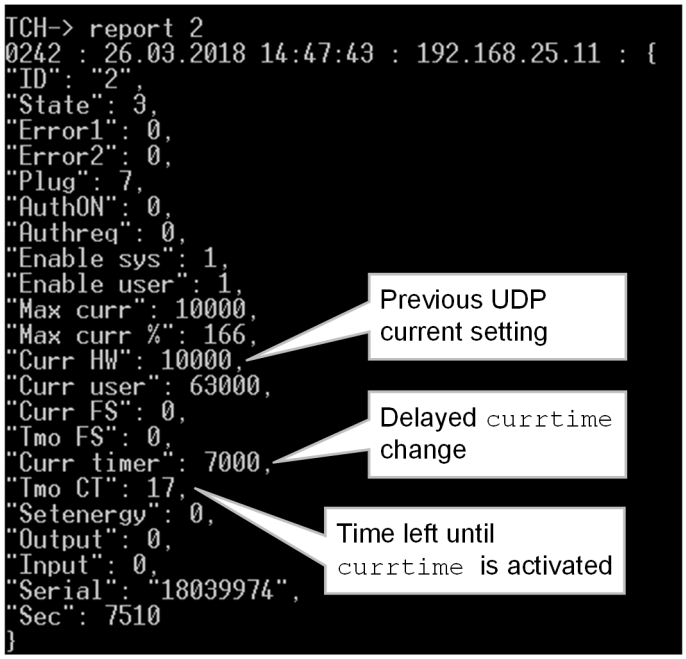
Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

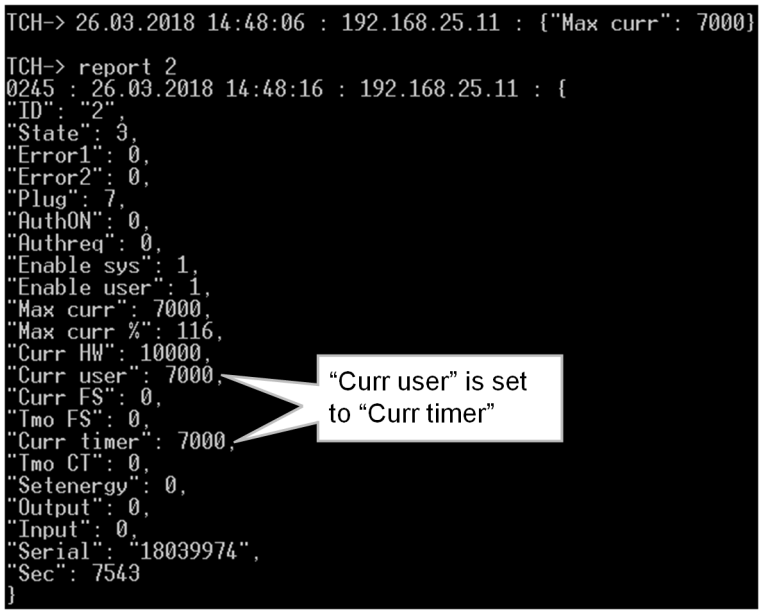
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Example 1

- Vehicle is charging.
- UDP command `currtime 7000 20` was sent (charging current should change to 7 A after 20 s).



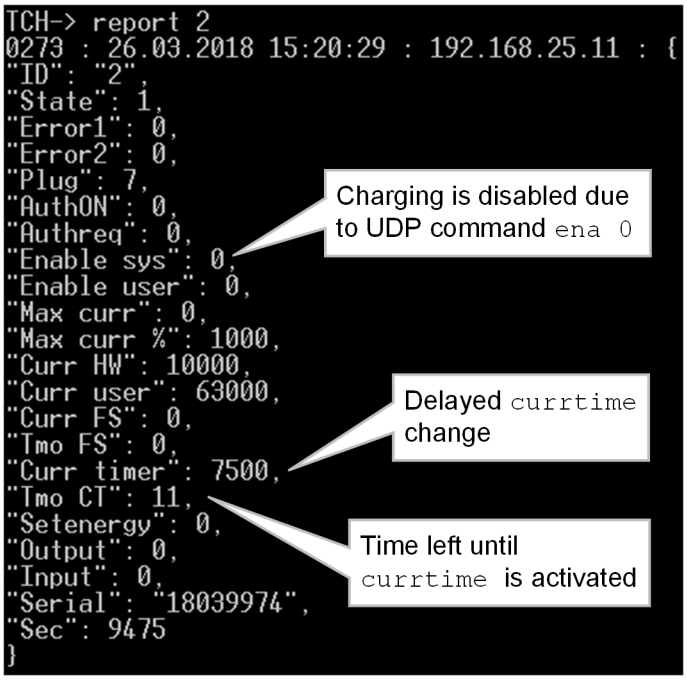
- After 20 seconds the current is changed.

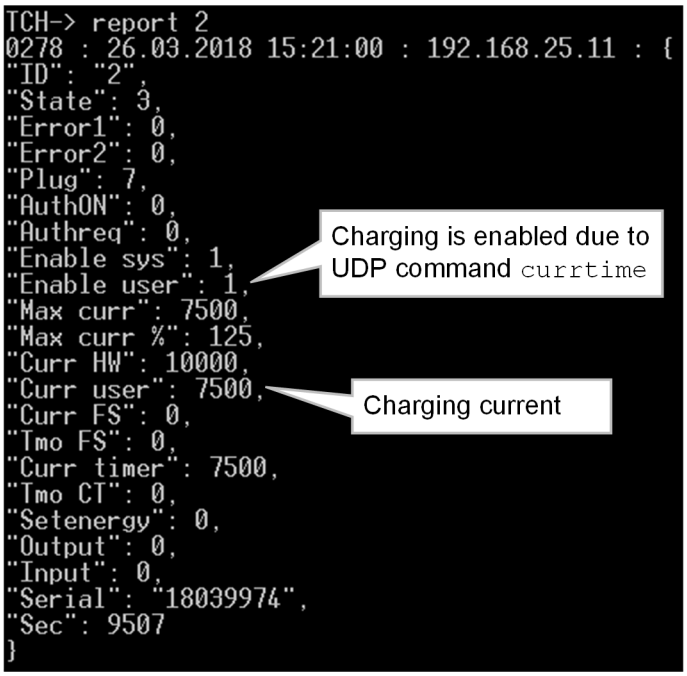


Example 2

- Cable is plugged into charging station and vehicle, furthermore the cable is locked.
- Charging is not allowed due to UDP command `ena 0`.
- UDP command `currtime 7500 15` was sent to start the charging session.

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4.2.7 UDP command: setenergy

The command `setenergy` can be used to set an energy limit for an already running or the next charging session. If the energy limit is greater than or equal to the value in the `E pres` field of `report 3` the charging session will be stopped and the device will be deactivated (similar to `ena 0`). All settings caused by `setenergy` are not permanent and are reset at the next time the device registers that the EV plug is pulled from a vehicle inlet or the charging station is restarted. The `setenergy` command must only be used during a charging session. The reference value (`E pres` from `report 3`) is reset at the beginning of a new charging session and not at the end of the charging session. This can lead to an unexpected disabling of the charging station if the value defined by `setenergy` is smaller than the energy transferred during the last charging session.

One variant of the `setenergy` command must be highlighted:

- `setenergy 0`: A previously set energy limit is deactivated

Command structure

Command	Parameters	Additional Description
`setenergy [e]`	[e]: Energy value	Energy value in 0.1 Wh, e. g. `setenergy 100000` specifies 10 kWh. Possible values: 0; 1 - 999999999 Max. value is 99999999.9 Wh (higher values will cause a counter overflow)

Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

4.2.8 UDP command: output

Output opens and closes the relay terminal X2. X2 is located in the connection panel of the charging station. The reply `TCH-OK` confirms only the receiving of the command and not the correctness of the value. Values between 2 and 9 are not being replied to (reserved functions). Invalid values (e.g. letters) are leading to a deactivation of the relay. The correct reception can be verified using `report 2`.

Information

This command needs DSW1.2 to be set to OFF.

Command structure

Command	Parameters	Additional Description
`output [n]`	0	Open
	1	Close
	>= 10	Pulse output with the specified number of pulses (pulses / kWh) and is stored in the EEPROM; reasonably usable up to 150.

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Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message
	TCH-ERR:: not allowed	• Incorrect setting of the DIP switch. • Software configuration for the phase switching option (WebUI).

4.2.9 UDP command: start

The command `start` can be used to authorize a charging session if the authorization function is activated. The effect is the same as holding an RFID card in front of the RFID reader. The command needs a valid RFID tag from the whitelist of the charging station. The token (tag) and the classifier are hexadecimal strings as in `report 100`.

Command structure

Command	Parameters	Additional Description
`start [id] [class]`	[id]: RFID tag	8 byte hex string, identifier of RFID card
	[class]: RFID class	10 byte hex string, classifier of RFID card

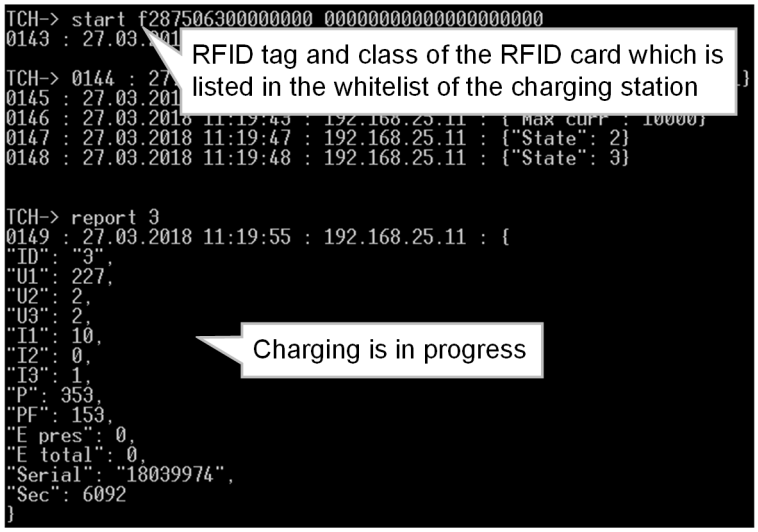
Reply structure

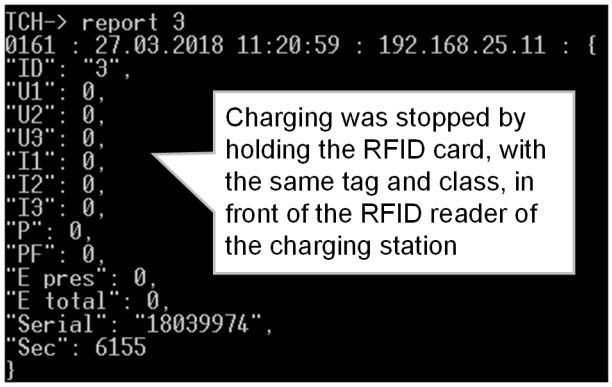
Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

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Example

- Authorization is set to "ON"
- Charging station and vehicle are ready to start the charging session





4.2.10 UDP command: stop

The command `stop` can be used to deauthorize a charging session if the authorization function is activated. The effect is the same as holding an RFID card in front of the RFID reader during a running charging session. The deauthorization will only work correctly if the RFID tag used is the same as the one used to start the charging session.

Command structure

Command	Parameters	Additional Description
`stop [id]`	[id]: RFID tag	8 byte hex string, identifier of RFID card

Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

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Example

- Authorization is set to "ON"
- Charging station and vehicle are ready to start the charging session
- RFID card has been held in front of the RFID reader and the charging session has started

```
TCH-> report 100
0116 : 27.03.2018 10:32:11 : 192.168.25.11 : {
"ID": "100",
"Session ID": 27,
"Curr HW": 10000,
"E start": 0,
"E pres": 0,
"started[s]": 3134,
"ended[s]": 0,
"started": "3134000",
"ended": "0",
"reason": 0,
"timeQ": 0,
"RFID tag": "f287506300000000",
"RFID class": "00000000000000000000",
"Serial": "18039974",
"Sec": 3227
}
```

RFID tag of the current charging session

- The charging session is stopped using the UDP-command `stop` and the RFID tag.

RFID tag

```
TCH-> stop f287506300000000
0130 : 27.03.2018 10:45:49 : 192.168.25.11 : TCH-OK :done

TCH-> 0131 : 27.03.2018 10:45:50 : 192.168.25.11 : {"Enable sys": 0}
0132 : 27.03.2018 10:45:50 : 192.168.25.11 : {"State": 5}
0133 : 27.03.2018 10:45:50 : 192.168.25.11 : {"Max curr": 0}


TCH-> report 3
0134 : 27.03.2018 10:45:54 : 192.168.25.11 : {
"ID": "3",
"U1": 0,
"U2": 0,
"U3": 0,
"I1": 0,
"I2": 0,
"I3": 0,
"P": 0,
"PF": 0,
"E pres": 0,
"E total": 0,
"Serial": "18039974",
"Sec": 4051
}
```

Charging is stopped

4.2.11 UDP command: setdatetime

The charging station tries to set its date and time via an NTP time server. If the device cannot access an NTP time server the “started” time in `report 100` will contain the same information as “started [s]”. A reason for not setting the time stamp via NTP time sever could be that the charging station has no internet connection.

If P30 x-series is used, the time stamp will be provided by the XPU. With the UDP command `setdatetime` it is possible to set a date and a time for the charging station. Depending on how and when the time stamp was set, it can be distinguished between how trustworthy the time stamp is.

Strong synced time:

- time was synced within 4320 minutes (3 days) via NTP

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- time was synced within 4320 minutes (3 days) via OCPP
- time was synced within 4320 minutes (3 days) via PROXY

Weak synced time

- time was synced via web interface
- time was synced via UDP
- time was not synced within 4320 minutes (3 days) via NTP
- time was not synced within 4320 minutes (3 days) via OCPP
- time was not synced within 4320 minutes (3 days) via PROXY

Not synced time

- time was set via start of the system on the build time

The time quality (“timeQ”) can be found in `report 1` and `report 1xx`.

Command structure

Command	Parameters	Additional Description
`setdatetime [s]`	[s]: seconds	Unix epoch time (e.g. 1497944434)

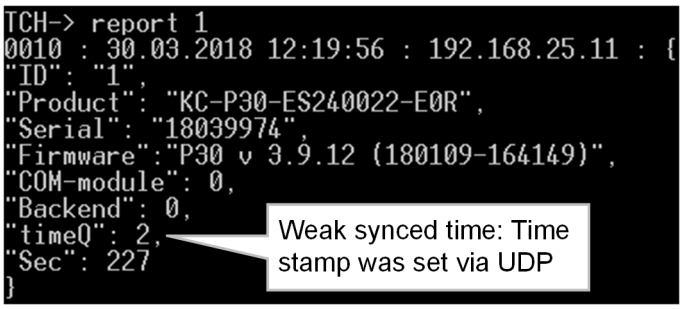
Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

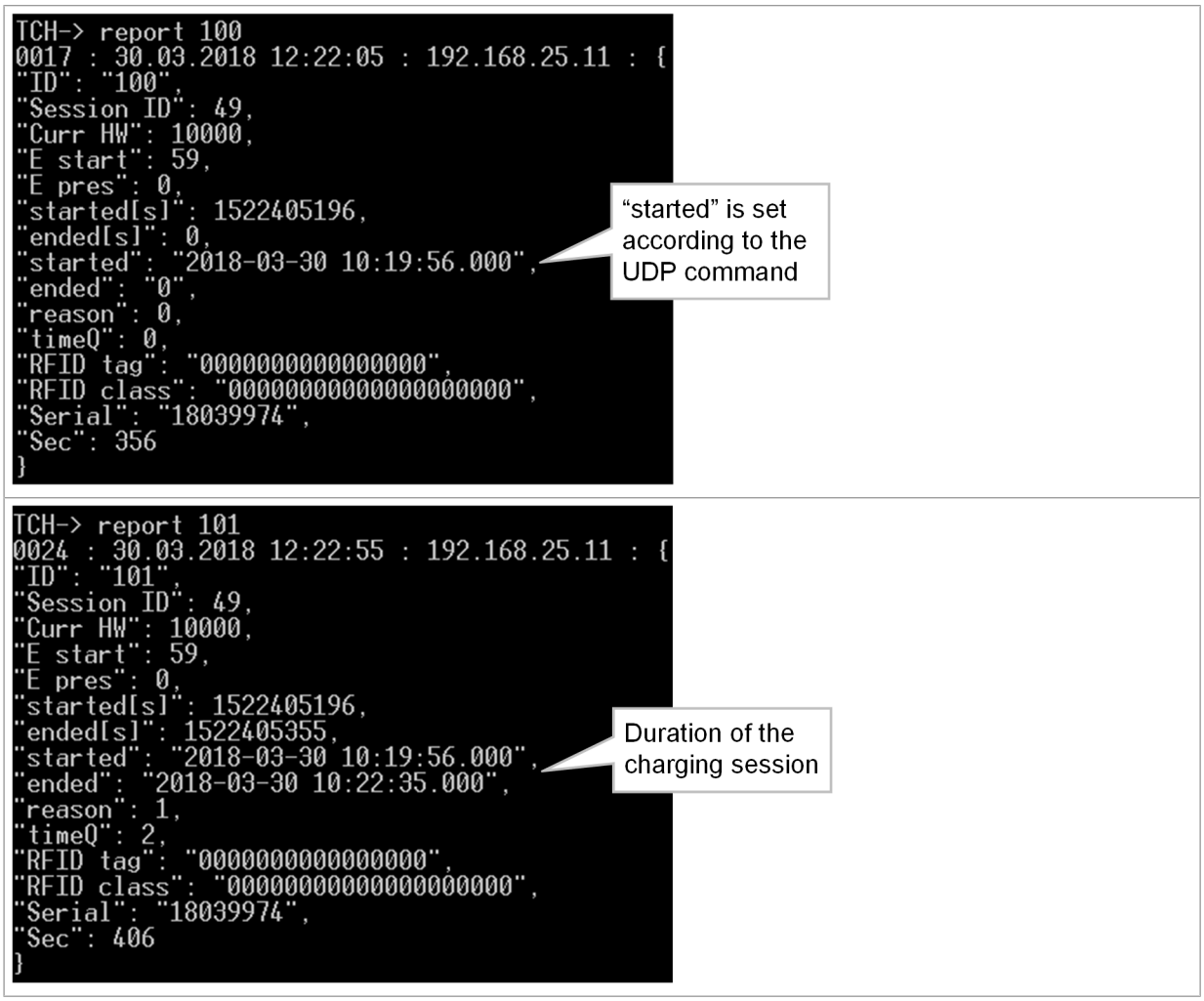
Example

- Vehicle is charging.





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4.2.12 UDP command: display

Command structure

Command	Parameters	Additional Description
`display [a] [min] [max] [tk] [text]`	[a]	Determines whether default or non-default values are used for the duration [text] is displayed. 0 = default (min duration = 2 sec, max duration = 10 sec, fixed token); 1 = min and max duration can be defined.
	[min]	Defines the duration in seconds how long the text is displayed before another display command will be processed (internal MID metering relevant information may overrule this).
	[max]	Defines the duration in seconds how long the text is displayed if no additional display command follows.
	[tk]	Token – for internal use only.
	[text]	Text shown on the display. A maximum of 23 ASCII characters can be used. Note: $ will be replaced by a blank space. ~ will be replaced by a Σ

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Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

Example

```
TCH-> display 0 0 0 0 KEBA
0200 : 27.03.2018 13:09:54 : 192.168.25.11 : TCH-OK :done
```



4.2.13 UDP command: unlock

The command `unlock` unlocks the socket of the device. The charging process has to be stopped first (e.g. via `currtime 0 1` or `ena 0`)

Command structure

Command	Parameters	Additional Description
`unlock`	-	-

Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

4.2.14 UDP command: x2src

The command `x2src` specifies the communication channel, which is used for toggle the contact x2.

Command structure

Command	Parameters	Additional Description
`x2src`	0	No phase toggle source is available
	1	Toggle via OCPP
	2	Direct toggle command via RESTAPI
	3	Toggle via Modbus
	4	Toggle via UDP

Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

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4.2.15 UDP command: x2

The command `x2` triggers the external phase switch via contact x2.

When switching between the parameters, a cool down time of 5 minutes is required.

Command structure

Command	Parameters	Additional Description
`x2`	0	1 phase (default value)
	1	3 phases

4.3 UDP commands with permanent effects

The following UPD commands should not be used regularly, especially not with mobile applications, as they change the device`s behavior permanently until they are overwritten or the device gets rebooted.

4.3.1 UDP command: ena

The `ena` command can be used to permanently disable the system by using the parameter 0. After receiving `ena 0` the device will be disabled until it is rebooted or `ena 1` or `currtime` are used. Reaching a failsafe timeout (if `failsafe` has been activated) will also enable the device again. The execution of `ena 0` will take approximately 1 second. If `ena 0` is used, then no other command should be sent for 2 seconds to ensure an undisturbed execution of the disable command.

Command structure

Command	Parameters	Additional Description
`ena [m]`	[m]: modifier	Modifier for the `ena` command Possible values: 0, 1; Other values may not be used.

Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

Example

- Authorization is set to "OFF"
- UDP command `ena 0` was sent before the vehicle was connected to the charging station.
- Charging station and vehicle are ready to start the charging session.

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TCH-> ena 0
0009 : 27.03.2018 13:22:17 : 192.168.25.11 : TCH-OK :done
0010 : 27.03.2018 13:22:17 : 192.168.25.11 : {"Enable sys": 0}
TCH-> 0011 : 27.03.2018 13:22:22 : 192.168.25.11 : {"Plug": 1}
0012 : 27.03.2018 13:22:23 : 192.168.25.11 : {"Plug": 3}
0013 : 27.03.2018 13:22:25 : 192.168.25.11 : {"Plug": 7}
TCH-> report 2
0014 : 27.03.2018 13:22:33 : 192.168.25.11 : {
"ID": "2",
"State": 1,
"Error1": 0,
"Error2": 0,
"Plug": 7,
"AuthON": 0,
"Authreq": 0,
"Enable sys": 0,
"Enable user": 0,
"Max curr": 0,
"Max curr %": 1000,
"Curr HW": 10000,
"Curr user": 63000,
"Curr FS": 0,
"Tmo FS": 0,
"Curr timer": 0,
"Tmo CT": 0,
"Setenergy": 0,
"Output": 150,
"Input": 0,
"Serial": "18039974",
"Sec": 446
}
Charging session is not started due to UDP command ena 0


TCH-> 0015 : 27.03.2018 13:22:39 : 192.168.25.11 : {"Plug": 3}
0016 : 27.03.2018 13:22:40 : 192.168.25.11 : {"Plug": 1}
0017 : 27.03.2018 13:22:44 : 192.168.25.11 : {"Plug": 0}
0018 : 27.03.2018 13:22:48 : 192.168.25.11 : {"Plug": 1}
0019 : 27.03.2018 13:22:49 : 192.168.25.11 : {"Plug": 3}
0020 : 27.03.2018 13:22:53 : 192.168.25.11 : {"Plug": 7}
TCH-> report 2
0021 : 27.03.2018 13:23:00 : 192.168.25.11 : {
"ID": "2",
"State": 1,
"Error1": 0,
"Error2": 0,
"Plug": 7,
"AuthON": 0,
"Authreq": 0,
"Enable sys": 0,
"Enable user": 0,
"Max curr": 0,
"Max curr %": 1000,
"Curr HW": 10000,
"Curr user": 63000,
"Curr FS": 0,
"Tmo FS": 0,
"Curr timer": 0,
"Tmo CT": 0,
"Setenergy": 0,
"Output": 150,
"Input": 0,
"Serial": "18039974",
"Sec": 473
}
Unplugging the vehicle does not change the state “Enable sys: 0” in contrast to currtime 0 1

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4.3.2 UDP command: curr

The command `curr` can be used to control the target charging current at any time. This command directly changes the value in the "Curr user" field in `report 2`. All changes made by `curr` are permanent until the device is rebooted. The only option to remove a `curr` setting without a restart is to overwrite it with a `currtime` command. When the `currtime` setting is copied from "Curr timer" to "Curr user" the value from a previous `curr` is overwritten and thus is resettable by unplugging (see section command: `currtime`). In general, it is not recommended to use the `curr` command, since the current can be easily controlled via the non-permanent `currtime`. If the charging current of the charging station needs to be lowered permanently, a reconfiguration of the DIP switch settings is recommended (see “installation manual”).

Command structure

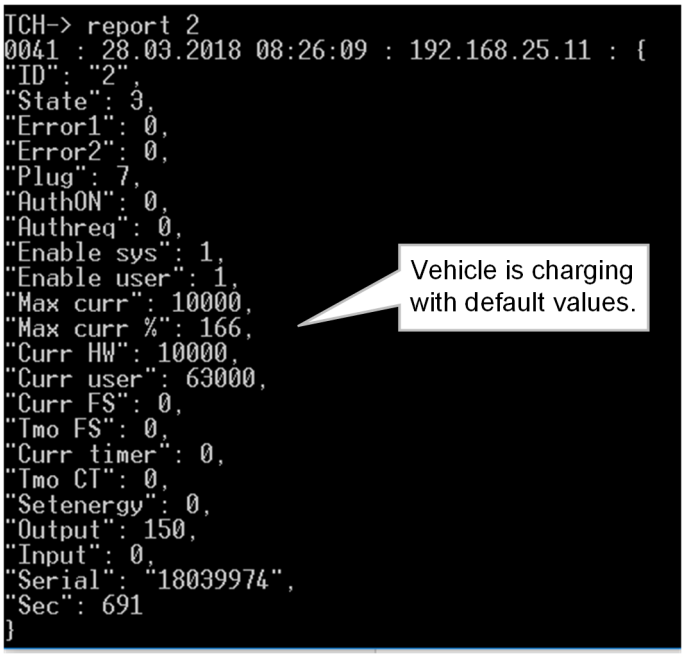
Command	Parameters	Additional Description
`curr [c]`	[c]: Current setting	Current value in mA Possible values: 6000 - 63000

Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

Example

- Vehicle is charging.



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4.3.3 UDP command: failsafe

The `failsafe` function is a way to detect a failure of the network communication between the UDP application and the charging station. In this case, the charging station will fall into a state with a definable current limitation. By default, the `failsafe` function is disabled and must be enabled by the application.

This function must be used with caution. It should be noted that all P30 charging stations offer multiple ways to set up the device in such a way that electrical overload can be avoided. The hardware switches (DIP switches) allow to configure a limit for the maximum charging current that cannot be increased by UDP commands. The charging station also offers a monitoring function of the electrical connection of the household (in conjunction with an appropriate meter) preventing overload situations.

A triggered `failsafe` function can be recognized via the data offered by `report 2`: the "Enable sys" value is set to 0 and "Max curr" is equal to "Curr FS". After the `failsafe` function has been activated due to a timeout, you must set the values of current and the load enable again using the associated commands `currtime` / `curr` and `ena`.

`ena 0` will not deactivate the failsafe function, to do so you have to disable it by sending `failsafe` 0 0 1.

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Command structure

Command	Parameters	Additional Description
`failsafe [t] [c] [s]`	[t]: Time delay	Timeout in seconds before the failsafe mode will be activated. The device must receive a `curr`, `currtime` or `ena` command to prevent the activation. Possible values: 0; 5 - 600 0: Disable failsafe mode
	[c]: Current setting	Maximum charging current in failsafe mode. Possible values: 0; 6000 - 63000 0: Disable charging in failsafe mode (similar to `ena 0`). The failsafe function will still be active after a reboot.
	[s]: Saved value	0: The failsafe function is active until the device is restarted. 1: The failsafe function is active and saves the settings into the EEPROM. The failsafe function will still be active after a reboot.

Reply structure

Field	Contents	Additional Description
-	TCH-OK: done	Generic confirmation message

4.4 UDP status messages

P30 will send status messages to the source/IP address of the last UDP command it received. That means if there is only one application in the network sending commands to the charging station, the application will get the information about the most important state changes without the need to poll reports. P30 will provide the information about the following state changes:

- “State” (see “report 2”)
- “Plug” (see “report 2”)
- “Input” (see “report 2”)
- “Enable sys” (see “report 2”)
- “Max curr” (see “report 2”)
- “E pres” (see “report 3”)

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