KeContact

P40, P40 Pro
Charging Station
Modbus TCP Programmers Guide V 1.02

Original manual

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Record of Revision

Version	Date	Description of the change	Modified by
1.00	01-2025	Manual newly created	born
1.01	02-2025	Added text that register 1550, 1552, 5050 and 5052 requires a future software update	born
1.02	04-2025	Register 1200 (Fast charging state): changed type to UINT32 Register 5004 (Set charging current): changed supported values Register 5014 (Enable/Disable charging station): changed text and is available with later software version Added “Known bugs section”	born

Table of contents

1 Introduction

1.1 Safety instructions

This document is an extension to the supplied manuals of KeContact P40.

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

1.2 Purpose of the document

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

Target group

This document contains information for persons who have technical knowledge and programming skills in the field concerned and are qualified to carry out the necessary operations.

1.3 Documentation for further information

Detailed protocol description of the Modbus TCP standards is not given here. Further informations can be found online (e.g. http://www.modbus.org).

Manuals and additional information are available on our website:

www.keba.com/emobility-downloads

1.4 Legal disclaimer

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

This programming guide applies exclusively to KeContact P40.

It is possible that the present programming guide is incomplete or is not correct. However, the information in this programming guide will be checked regularly and corrections will be made in the next version.

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2 Overview

This programmers guide provides the information required to use the Modbus TCP interface for sending or reading parameters to certain registers of the charging station. The Modbus TCP interface can be used for example by energy managers to calculate the actual current and react correspondingly to reduce or increase the charging current. The Modbus TCP interface can also be used to control/limit the power consumption of connected electric vehicles.

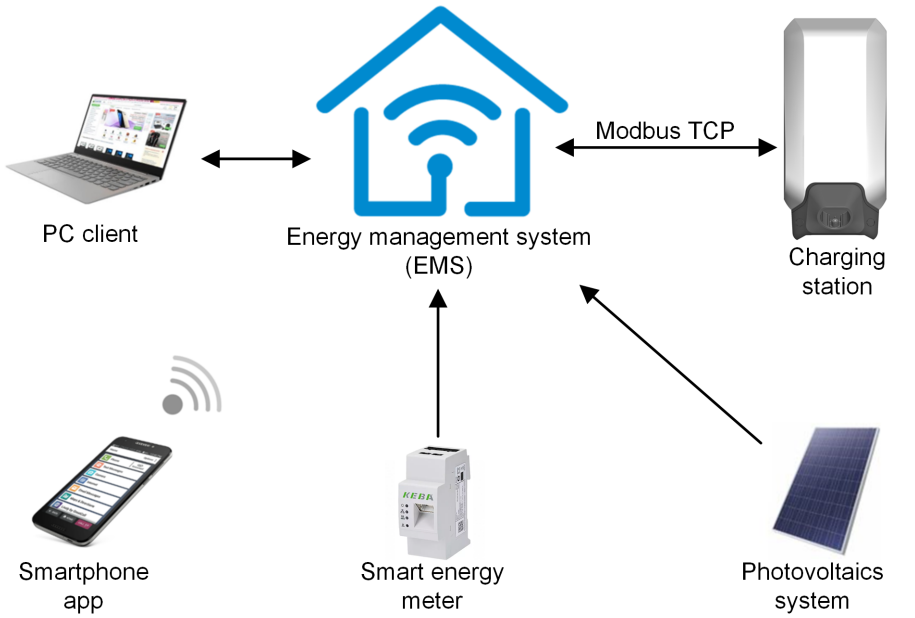

Fig. 2-1: Schematic overview (example)

Modbus TCP is a standardized communication protocol that enables data exchange between a master (usually a computer) and several slaves (charging stations). It is part of the IEC 61158 standard. The Modbus protocol enables control of the connected slaves and transmission of measurement data from the slave to the master. The data are sent via TCP/IP.

Technical requirements / Connection configuration

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

- The charging station has to be connected to the same network as the application.
- A PC, energy management system (EMS) or smartphone for writing/reading registers via the Modbus TCP interface is necessary. This also requires a suitable client software or app.
- The Modbus TCP control interface must be enabled on the charging station. In standard cases it is turned off. This can be done via the KEBA eMobility App or via OCPP.
- The IP address of the charging station can be read out via the KEBA eMobility App or the avahi broadcast can be used to determine the IP address. The IP address is needed to transport the Modbus commands.

- If Modbus TCP is activated, an additional port is opened in the firewall. Standard port for Modbus is **502**.
- The **Unit ID** for communication is set to **255**.
- Because RFID cards are considered to contain sensitive information, the reading of them on the register needs to be activated additionally.
- There is no secure communication available over Modbus TCP.

Available functions

When communicating via Modbus TCP with a KeContact P40 Product, the following applies:

- Supported function codes are **FC3 (Read)** and **FC6 (Write)**.
- It is not possible to read several registers at once.
- The maximum reading length is **2 words**, as the return values for a single register are **UINT32**.
- Starting register address count is 0. Depending on the used implementation, +1 might have to be added to address the correct register on the EMS.
- The interval for reading registers is 0,5 seconds. The interval for writing registers is 5 seconds.

Frame

When sending a Modbus TCP frame, the frame is split into 6 different sections:

The TCP message starts with a transaction identifier. This is followed by the protocol identifier (0000) and the number of the following bytes. The address and the function field are followed by the data, which varies in size depending on the length of the message. The registers must be sent in decimal format (e.g. charging state - register 1000).

The following attributes are available:

- ro ... read only
- wo ... write only

Name	Length	Description
Transaction ID	2 bytes	For synch between messages of server and client
Protocol ID	2 bytes	0 for Modbus TCP
Length field	2 bytes	Number of remaining bytes in this frame
Unit ID	1 byte	Slave address (must be 255)
Function code	1 byte	FC3 (Read), FC6 (Write)
Data	[n] bytes	Data as response or commands

3 Readable registers

This chapter describes all readable registers that are supported by KeContact P40.

3.1 Current measurement

3.1.1 1008 - Charging current phase 1

This register contains the measured current value on phase 1 in milliamperes.

Unit: mA

Index	Name	Type	Attr.
1008	Current L1	UINT32	ro

Example:

Value 645: The charging current on phase 1 is 645 mA = 0.645 A.

3.1.2 1010 - Charging current phase 2

This register contains the measured current value on phase 2 in milliamperes.

Unit: mA

Index	Name	Type	Attr.
1010	Current L2	UINT32	ro

Example:

Value 1011: The charging current on phase 2 is 1011 mA = 1.011 A

3.1.3 1012 - Charging current phase 3

This register contains the measured current value on phase 3 in milliamperes.

Unit: mA

Index	Name	Type	Attr.
1012	Current L3	UINT32	ro

Example:

Value 645: The charging current on phase 3 is 645 mA = 0.645 A.

3.2 Power and energy measurements

3.2.1 1020 - Active power

This register contains the active power in milliwatts.

Unit: mW

Index	Name	Type	Attr.
1020	Active Power	UINT32	ro

Example:

Value 98661: The active power of the charging station is 98661 mW = 98.661 W.

3.2.2 1036 - Total energy

This register contains the total energy consumption (persistent, device related) in watt-hours.

Unit: 0.1 Wh

Index	Name	Type	Attr.
1036	Energy Meter	UINT32	ro

Example:

Value 38101: The total energy consumption of the charging station is: 3810.1 Wh = 3.8101 kWh.

3.2.3 1046 - Power factor

This register contains the current power factor (cos phi) in 0.1 %.

Index	Name	Type	Attr.
1046	PF	UINT32	ro

Example:

Value 928: The measured power factor (cos phi) is 92.8%.

3.2.4 1040 - Voltage phase 1

This register contains the measured voltage value on phase 1 in volts.

Unit: V

Index	Name	Type	Attr.
1040	U1	UINT32	ro

Example:

Value 230: The measured voltage value on phase 1 is 230 V.

3.2.5 1042 - Voltage phase 2

This register contains the measured voltage value on phase 2 in volts.

Unit: V

Index	Name	Type	Attr.
1042	U2	UINT32	ro

Example:

Value 230: The measured voltage value on phase 2 is 230 V.

3.2.6 1044 - Voltage phase 3

This register contains the measured voltage value on phase 3 in volts.

Unit: V

Index	Name	Type	Attr.
1044	U3	UINT32	ro

Example:

Value 230: The measured voltage value on phase 3 is 230 V.

3.3 State information

3.3.1 1000 - Charging state

This register contains the state of the charging station.

Index	Name	Type	Attr.
1000	State	UINT32	ro

Supported values:

- 0: Start-up of the charging station
- 1: The charging station is not ready for charging. The charging station is not connected to an electric vehicle, it is locked by the authorization function or another mechanism.
- 2: The charging station is ready for charging and waits for a reaction from the electric vehicle.
- 3: A charging process is active.
- 4: An error has occurred.
- 5: The charging process is temporarily interrupted because the temperature is too high or the wallbox is in suspended mode.

3.3.2 1004 - Cable state

This register contains the state of the charging cable.

Index	Name	Type	Attr.
1004	Cable State	UINT32	ro

Supported values for cable variants:

- 3: Cable is connected to the charging station (not to the electric vehicle). It is always connected due to the cable variant.
- 7: Cable is connected to the charging station and the electric vehicle (there is no locking mechanism).

Supported values for socket variants:

- 0: No cable is plugged.
- 1: Cable is connected to the charging station (not to the electric vehicle).
- 3: Cable is connected to the charging station and locked (not to the electric vehicle).
- 5: Cable is connected to the charging station and the electric vehicle (not locked).
- 7: Cable is connected to the charging station and the electric vehicle and locked (charging).

3.3.3 1006 - Error code

This register contains the error code of the charging station. If the “charging state” is in state 4 (error), the error code is visible.

Index	Name	Type	Attr.
1006	EVSE Error Code	UINT32	ro

Supported values:

- 0: No error
- >1: Specific error code. The represented value is in decimal.

3.4 Product information

3.4.1 1014 - Serial number

This register contains the serial number of the charging station.

Index	Name	Type	Attr.
1014	Serial	UINT32	ro

Example:

Value 18416854: The serial number of the charging station is 18416854.

3.4.2 1016 - Product type and features

This register contains the type and the most important features of the charging station.

Index	Name	Type	Attr.
1016	Product	UINT32	ro

The product key is reported with the following logic:

Product family | Device current | Connector | Phases | Metering | RFID | Button

Supported values	
Product Family	4 = KCP-40
Device Current	1 = 16...16A 2 = 32...32A
Connector	1 = Cable ("C", "P", "T", "N" in the product key under connector) 2 = Socket ("S", "R" in the product key under connector)
Phases	1 = 1...1-phase 2 = 3...3-phase 3 = S...3to1 switching (phase switching) 4 = R...Rotation
Metering	0 = 0...none ("0" in product key) 1 = E...Energy meter 2 = M...MID[1)] meter 3 = L...Legal Meter (MessEV)
RFID	0 = 0...none 1 = R...RFID
Button	0 = 0...none 1= B...Button

[1)] MID (Measuring Instruments Directive): Measuring Instruments Directive

Example:

Value 4212311: Represents the relevant digits for example of this product key [**KC-P40-32**EU0-**C**63A**L**P0-LS1**R**1111**B**L0-CL00].

3.4.3 1018 - Software package version

This register contains the software version of the whole release. It is provided without the dots in the release. Two digits are reserved for each version (major/medium/minor):

Index	Name	Type	Attr.
1018	Firmware	UINT32	ro

Example:

Value 10000: This means software release 1.0.0

3.4.4 1700 - Hardware revision device

This register contains the hardware revision of the device.

Index	Name	Type	Attr.
1700	HW Revision Device	UINT32	ro

Example:

Value 3: This means hardware revision 3.

3.4.5 1702 - Hardware revision KC-MS10

This register contains the hardware revision of the KC-MS10.

Index	Name	Type	Attr.
1702	HW Revision MS10	UINT32	ro

Example:

Value 3: This means hardware revision 3.

3.5 Charging limits

3.5.1 1100 - Max charging current

This register contains the maximum charging current of the charging station.

Unit: mA

Index	Name	Type	Attr.
1100	Max Current	UINT32	ro

Example:

Value 10000: The maximum charging current of the charging station is 10000 mA = 10 A.

3.5.2 1110 - Max supported current

This register contains the maximum current value that can be supported by the hardware of the charging station. This value includes the current setting (Installer mode), cable coding and temperature reductions.

Unit: mA

Index	Name	Type	Attr.
1110	Curr HW	UINT32	ro

Example:

Value 10000: The maximum current value supported by the charging station is 10000 mA = 10 A.

3.5.3 1200 - Fast charging status

This register contains the fast charging state (active or not).

Index	Name	Type	Attr.
1200	Fast Charging State	UINT32	ro

Supported values:

0: Fast charging is deactivated.

1: Fast charging is activated and current cannot be controlled via Modbus TCP.

3.6 Session information

3.6.1 1500 - RFID card

This register contains the first 4 bytes of the serial number (UID) of the used RFID card. This register can be read if the charging session was authorized with an RFID card. The represented value is in decimal and has to be converted to hex in order to read the UID.

Index	Name	Type	Attr.
1500	RFID tag	UINT32	ro

Example:

Value 3570234960 converted to hex = D4CD7650 for the serial number (first 4 bytes) of the used RFID card.

3.6.2 1502 - Charged energy

This register contains the transferred energy of the current charging session.

Unit: 0.1 Wh

Index	Name	Type	Attr.
1502	E pres	UINT32	ro

Example:

Value 165: The transferred energy of the current charging session is 16.5 Wh.

3.7 Phase switching settings

3.7.1 1550* - Phase switching source

*)… Function will be made available with a later software update.

This register contains the source which is used to trigger the phase switching.

Index	Name	Type	Attr.
1550	Phase switching source	UINT32	ro

Supported values:

- 0: No phase toggle source is available
- 1: Toggle via OCPP
- 2: Direct toggle command via RESTAPI
- 3: Toggle via Modbus TCP

3.7.2 1552* - Phase switching state

*)… Function will be made available with a later software update.

This register contains how many phases are able to be used (1 or 3 phases).

Index	Name	Type	Attr.
1552	Phase switching state	UINT32	ro

Supported values:

- 1: Single-phase charging is used
- 3: 3-phase charging is possible

3.8 EMS Failsafe settings

3.8.1 1600 - Failsafe current setting

This register contains the set failsafe current in case the connection between EMS and charging station is not working.

Unit: mA

Index	Name	Type	Attr.
1600	Failsafe current setting	UINT32	ro

Example:

Value 6000: The failsafe current is set to 6000 mA.

3.8.2 1602 - Failsafe timeout setting

This register contains the timeout between two Modbus TCP requests until the charging station is turning into the failsafe charging mode with the limit defined with register 1600.

Unit: s

Index	Name	Type	Attr.
1602	Failsafe Timeout Setting	UINT32	ro

Example:

Value 11: The failsafe timeout is set to 11 s.

4 Writable registers

This chapter describes all writeable registers that are supported by KeContact P40.

4.1 5004 - Set charging current

In this register, the charging current can be set in order to control the charging current. This command directly changes the value permanently until the next value is sent.

It is not possible that the charging station is connected to an EMS in parallel to a connection to an external meter. Otherwise these inputs may contradict one another.

The EMS integration has more priority on the charging limit than OCPP.

Unit: mA

Index	Name	Type	Attr.
5004	Curr User	UINT16	wo

Supported values:

- 0: Supends the charging session
- 6000 − 32000

Example:

Value 8000: The charging current is set to 8000 mA = 8 A.

4.2 5010 - Set energy

In this register, the energy transmission for the current charging session can be set. Once this value is reached, the charging session is terminated.

Unit: 10 Wh

Index	Name	Type	Attr.
5010	Setenergy	UINT16	wo

Supported values:

0: Deletes a previously set energy limit.

>0: Sets the energy limit to the desired value.

Example:

Value 1: The charging session is terminated after an energy transmission of 10 Wh = 0.01 kWh.

4.3 5012 - Unlock plug

In this register, the plug of the charging station can be unlocked. The EMS can send to unlock the connector. The unlock will stop a running charging session and the unlock the connector.

It is not possible to lock the connector via Modbus TCP.

Index	Name	Type	Attr.
5012	Unlock	UINT16	wo

Supported values:

- 0: unlock the plug

4.4 5014* - Enable/Disable charging station

*)… Function will be made available with a later software update.

In this register, the charging station can be enabled or disabled.

Index	Name	Type	Attr.
5014	Enable user	UINT16	wo

Supported values:

- 0: Disable charging station
- 1: Enable charging station

4.5 5050* - Set phase switching source

*)… Function will be made available with a later software update.

This register sets the phase switching source that is able to control the integrated phase switching mechanism.

Index	Name	Type	Attr.
5050	Set phase switch toggle	UINT16	wo

Supported values:

- 0: Phase switching deactivated
- 1: Phase switching via profiles (OCPP, PV algorithm)
- 2: Rest API direct control (EMS via Rest API or mobile App direct)
- 3: Phase switching via Modbus TCP

4.6 5052* - Trigger phase switch

*)… Function will be made available with a later software update.

With this register, the phase switch can be triggered via Modbus TCP if the phase switching source register 5050 is set to 3 (Modbus). The phase switch can be done from 3- to 1-phase charging and vice-versa.

If the phase switching request is triggered during the charging state, the charging process is suspended, then the phases are switched and afterwards the charging session can continue.

Index	Name	Type	Attr.
5052	Trigger phase switch	UINT16	wo

Supported values:

- 0: 1 phase
- 1: 3 phases (default state)

4.7 Set EMS Failsafe

The EMS Failsafe registers can be used to define a fallback strategy in case the communication between the EMS and the charging station is lost.

Failsafe activation

To activate the Failsafe function, the “Failsafe Timeout” needs to be set >0. Then the set “Failsafe current” will get active in case no command has been received by the EMS via Modbus TCP.

Determine lost connection

If the “Failsafe Timeout” is > 0, then the charging station sets the value as a timer on a received Modbus TCP command. If the timer runs out before the next Modbus TCP command is received, then the charging station goes into the failsafe state.

Receiving a command resets the timer and sets the charging station out of the failsafe state.

Failsafe deactivation

To deactivate the failsafe function, the „Failsafe Timeout” needs to be set to "0".

4.7.1 5016 - Failsafe current

With this register, the charging current can be changed in case the connection between the charging station and the EMS is lost. In case the charging session detects that the connection is lost, the failsafe charging current is applied. If Failsafe Current=0 then charging is suspended.

Unit: mA

Index	Name	Type	Attr.
5016	Failsafe Current	UINT16	wo

Supported values:

- 0: Deactivates charging in case the connection is lost with the EMS.
- 6000 - 32000: Sets the Failsafe charging current [mA].

4.7.2 5018 - Failsafe timeout

This register sets the timeout for consecutive Modbus commands to determine if the connection is broken.

Index	Name	Type	Attr.
5018	Failsafe Timeout	UINT16	wo

Supported values:

- 0: Deactivates failsafe (charging will continue with the highest possible value).
- 5 - 600: Sets the Failsafe Timeout [s].

4.8 5200 - Activate fast charging

Activates fast charging for the ongoing charging session.

Index	Name	Type	Attr.
5200	Fast Charging	UINT16	wo

Supported values:

1: Activates fast charging

Information

It is not possible to deactivate Fast charging via Modbus TCP.

5 Known bugs section

In software versions below 1.2.1 the registers 1502 and 1036 falsely report the value in “Wh” instead of “0.1 Wh”.

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