Modbus Devices on KMC Commander

Application Guide

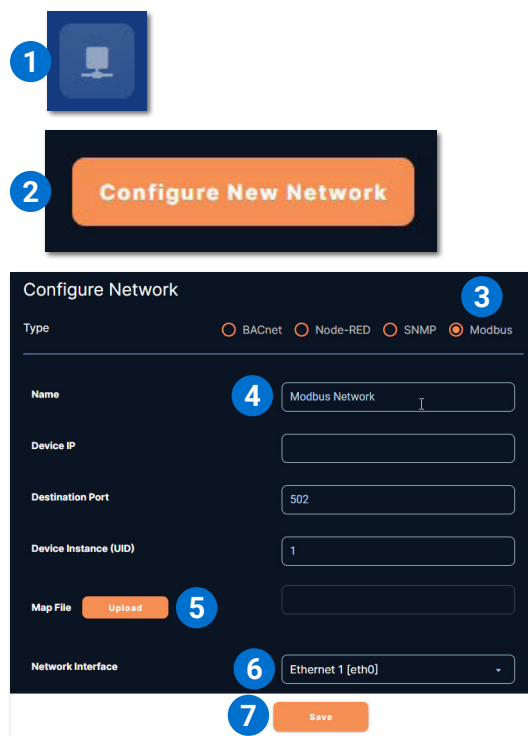## Contents

Commander Modbus Settings

Configuring a Modbus Network

To add a Modbus TCP protocol device on a network in KMC Commander:

1. Go to **Networks Explorer,** then **Networks** (selected by default).

2. Select **Configure New Network** to go to the **Configure Network** page.

3. For **Type**, select **Modbus**.

4. Enter relevant device information in the fields.

NOTE: For descriptions of the fields, see **Configuration Options on page 2**.

5. Upload the Modbus register map CSV file for the Modbus TCP device:

    A. Next to **Map File**, select **Upload**.

    B. Select **Choose file**.

    C. Locate the map file on your computer.

    D. Select **Upload**.

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6. Choose the **Network Interface** from the drop-down list.

7. Select **Save**.

NOTE: For **discovery and additional installation** instructions, see the **Configuring Devices** topic on **KMC Commander Help** or the same topic in the *KMC Commander Installation Guide* PDF. (See **Support Documents on page 7**.)

NOTE: Unlike BACnet, only one Modbus device is added to the "network" during discovery according to the information entered. For multiple Modbus devices, create multiple Modbus "networks."

NOTE: If the CSV file is not uploaded before the network is saved, it can be added later by editing that network, uploading the file, and selecting **Save**.

NOTE: See the device manufacturer's documentation for required Modbus device configuration and CSV information.

Configuration Options

Name

The user-assigned name for the Modbus device.

Device IP

The Internet address assigned to the Modbus TCP device.

Destination Port

The UDP port used by the device to listen for requests. The default is 502.

Device Instance

A (0 to 255) number that identifies the device. It is also known as the UID (for Unit Identifier).

Map File Upload

Allows loading the register map CSV file to the Commander. See **CSV File Properties on page 3**.

Network Interface

The physical port (e.g., Ethernet 1) on the KMC Commander gateway used to connect to the Modbus device.

CSV File Properties

Introduction

The following sections define the CSV file structure used to map Modbus registers for KMC Commander. KMC also provides sample CSV files on the KMC web site. See **Sample CSV Information on page 6**.

NOTE: When the Modbus register CSV file is created, it should be saved with **UTF-8 encoding** (before uploading into KMC Commander).

Comments

The CSV file can include comment lines by starting with a **#**. This is useful for adding information such as model details, author, date, or file version that will not be read by Commander.

Comment line example:

```
#EIG Shark 100c Power Meter
```

Comments can also be used to temporarily skip a register line that is giving errors or is not wanted for a particular device. In the example below, the **second** address will be ignored:

```
440013,440013,1,UINT16BE,r,(REGISTER-
    2047)*300/2047,,,,,,Volts A-B, V,,

#440014,440014,1,UINT16BE,r,(REGISTER-
    2047)*300/2047,,,,,,Volts B-C, V,,

440015,440015,1,UINT16BE,r,(REGISTER-
    2047)*300/2047,,,,,,Volts C-A, V,,
```

Header Line

The CSV field headers are (for example):
```
id,register,registerSize,dataType,rw,
scale,scaleWrite,minVal,maxVal,
maxLength,displayPrecision,dis,unit,
enum
```

Some fields are optional. If a field is not used, a comma followed by no value is used. A space can also indicate a field is not used.

Required Fields

The required fields are:

- `id`
- `register`
- `registerSize`
- `dataType`
- `rw`
- `dis`

id

A numeric value that will be used as the identifier in the database. By convention the id is set to the register value.

register

The address provided by the Modbus device manufacturer for a given parameter.

Modbus uses a different function call depending on the type of information being stored, such as:

- Coils—1 to 9999
- Discrete inputs—10001 to 19999
- Input register—30001 to 39999
- Holding registers—40001 to 49999

registerSize

The number of registers needed to be read to get the full parameter value. For example, if the register is given as 40001 and the register size is 2, Commander will read registers 40001 and 40002. Most numeric registers will have a size of 1 or 2. String types can use a few registers or have a register size of 10 or more.

dataType

Data types are:

- BOOL for single bit values (coils)
- UTF8 for strings
- ASCII for strings
- UINT16BE for 16 bit integers in big endian format
- UINT16LE for 16 bit integers in little endian format
- UINT32BE for 32 bit integers in big endian format
- FLOATBE floating point, big endian
- FLOATLE floating point, little endian
- FLOATLEW floating point bytewise, little endian

rw

The read or write status of the point as supplied by the device manufacturer.

scale

Use to convert the value read from the device mathematically before displaying or storing it in the database. Use the system variable `REGISTER` to represent the value read in from the device register. For example, if the value read is 11858.7021, `REGISTER/10` gives the result 118.587021.

For multiple operations the standard mathematical precedence is followed. Use parentheses to change the operator precedence. For example, to subtract from the register before multiplying: `(REGISTER-2047)*10/2047`.

scaleWrite

Use to convert the value as displayed and stored in the Commander database before writing it to the device. This only applies to points with a "w" read/write status. The same format as for scale is used.

minVal

A low limit to apply to the register value after the scale formula.

maxVal

A high limit to apply to the register value after the scale formula.

maxLength

A maximum length to apply to the register value. This applies only to strings.

displayPrecision

The number of decimals to use for floating point values.

dis

The display name. This is written to the dis property tag on the point object in the Commander database.

unit

The engineering unit. This is written to the unit property tag on the point object in the Commander database.

enum

In quotes list string values to display on cards and trends. Separate items with a comma. Example: "OFF,ON"

Sample CSV Information

#Veris TWLP Thermostat

id	register	registerSize	dataType	rw	scale	scaleWrite	minVal	maxVal	maxLength	displayPrecision	dis	unit	enum
30001	30001	1	UINT16BE	r							Temperature		
30002	30002	1	UINT16BE	r							Slider	%	

#Veris CWXP CO2 Thermostat with Slider

id	register	registerSize	dataType	rw	scale	scaleWrite	minVal	maxVal	maxLength	displayPrecision	dis	unit	enum
1	1	1	BOOL	r							Temperature Unit 0:C 1:F		
2	2	1	BOOL	r							Relay Override		
3	3	1	BOOL	r							Calibration Lockout		
4	4	1	BOOL	r							Override		
5	10001	1	BOOL	r							Relay Unit 0:C 1:F		
6	30001	1	UINT16BE	r							Co2	PPM	
7	30002	1	UINT16BE	r							Humidity	%RH	
8	30003	1	UINT16BE	r	REGISTER/10						Temperature	°F	
9	30004	1	UINT16BE	r							Slider	%	
10	40001	1	UINT16BE	r							CO2 setpoint	PPM	
11	40002	1	UINT16BE	r							CO2 deadband	PPM	
12	40003	1	UINT16BE	r							Auto Cal (0=normal; 1=low; 2=off)		
13	40004	1	UINT16BE	r	REGISTER/10						Temp Offset	°F	
14	40005	1	UINT16BE	r	REGISTER/10						RH Offset	%RH	

#Badger Meter 380 CS/HS Impeller Btu System

id	register	registerSize	dataType	rw	scale	scaleWrite	minVal	maxVal	maxLength	displayPrecision	dis	unit	enum
40001	40001	2	FLOATLEW	r							Sensor Temp	°F	
40003	40003	2	FLOATLEW	r							Remote Temp	°F	
40005	40005	2	FLOATLEW	r							Flow Rate	gpm	
40009	40009	2	FLOATLEW	r							Flow Total	gal	
40007	40007	2	FLOATLEW	r							Energy Rate	kBtu/hr	
40011	40011	2	FLOATLEW	r							Energy Total	Btu	
40013	40013	2	FLOATLEW	r							Energy Calc Mode		
40015	40015	2	FLOATLEW	r							Flow Filter		
40017	40017	2	FLOATLEW	r							Temp Coef		
40019	40019	2	FLOATLEW	r							Specific Heat		
40021	40021	2	FLOATLEW	r							Fluid Density		

#Dent PS3037 PowerScout Power Meter

id	register	registerSize	dataType	rw	scale	scaleWrite	minVal	maxVal	maxLength	displayPrecision	dis	unit	enum
44206	44206	5	UTF8	r							PowerScout		
44201	44201	5	UTF8	r							Model Number		
44206	44206	5	UTF8	r							Manufacturer Name		
44511	44511	1	UINT16BE	r							Hardware ID		
44069	44069	1	UINT16BE	r							Firmware Major		
44070	44070	1	UINT16BE	r							Firmware Minor		
44001	44001	2	UINT16BE	r							System Total True Energy	kWh	
44019	44019	1	UINT16BE	r	REGISTER/10						Volts L1 to L2	v	
44020	44020	1	UINT16BE	r	REGISTER/10						Volts L2 to L3	v	
44021	44021	1	UINT16BE	r	REGISTER/10						Volts L1 to L3	v	
44022	44022	1	UINT16BE	r	REGISTER/10						Line Frequency	Hz	
46022	46022	1	UINT16BE	r	REGISTER/10						Measured Line Frequency	Hz	
44602	44602	1	UINT16BE	rw							Data Scalar (3=0.1x; 4=1.0x)		

#EIG Shark 100c Power Meter

id	register	registerSize	dataType	rw	scale	scaleWrite	minVal	maxVal	maxLength	displayPrecision	dis	unit	enum
400001	400001	8	UTF8	r							Shark 100 Power Meter		
400017	400017	1	UINT16BE	r							Meter Type		
400009	400009	8	UTF8	r							Serial Number		
403132	403132	2	FLOATBE	r						3	Frequency Max	Hz	
5002	5002	2	UINT32BE	r	REGISTER*4						Time Since Reset	ms	
440001	440001	1	UINT16BE	r							Sanity Indicator		
440002	440002	1	UINT16BE	r	(REGISTER-2047)*150/2047						Volts A-N	V	
440003	440003	1	UINT16BE	r	(REGISTER-2047)*150/2047						Volts B-N	V	
440004	440004	1	UINT16BE	r	(REGISTER-2047)*150/2047						Volts C-N	V	
440005	440005	1	UINT16BE	r	(REGISTER-2047)*10/2047						Amps A	A	
440006	440006	1	UINT16BE	r	(REGISTER-2047)*10/2047						Amps B	A	
440007	440007	1	UINT16BE	r	(REGISTER-2047)*10/2047						Amps C	A	
440011	440011	1	UINT16BE	r	(REGISTER-2047)/1000						Power Factor 3-Ph Total		
440012	440012	1	UINT16BE	r	(REGISTER/4095)*30+45					3	Frequency	Hz	
440013	440013	1	UINT16BE	r	(REGISTER-2047)*300/2047						Volts A-B	V	
440014	440014	1	UINT16BE	r	(REGISTER-2047)*300/2047						Volts B-C	V	
440015	440015	1	UINT16BE	r	(REGISTER-2047)*300/2047						Volts C-A	V	
440022	440022	2	UINT32BE	r							Usage	wH	
430001	430001	1	UINT16BE	rw							CT Numerator		
440016	440016	1	UINT16BE	rw							CT Numerator		
430017	430017	8	ASCII	rw							Meter Desgination		
430026	430026	1	UINT16BE	rw							COM2 Address		
430028	430028	1	UINT16BE	rw							Limit 1 Identifier		
UNLOCK	422000	1	UINT16BE	w		5555					Initiate Programmable Settings Update		

NOTE: See **additional CSV examples** in Commander_Sample_Modbus_Map_Files.zip that can be downloaded from the KMC website. See **Support Documents on page 7**.

NOTE: See the device manufacturer's documentation for required Modbus device configuration and CSV information.

Important Notices

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Support Documents

All KMC Commander support documents are available on the KMC Controls website. Type the KMC Commander part number (e.g. **CMDR-ADVT-WIFI-BASE**) in the Search field. Log in to see all available files.

The information in the KMC Commander Installation Guide PDF is also available in an online format at **help.kmccommander.com**.

For advanced applications, API information is available at **api.kmccommander.com.**

NOTE: Documents, product design, and product specifications are subject to change without notice.