

# Conext™ Gateway

Modbus Interface Specification (502)

Conext™ XW Inverter/Chargers

990-91343C

Aug 10, 2021



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**Document Number:** 990-91343C

Rev C

**Date:** Aug 10, 2021

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## Revision History

| <b>Rev</b> | <b>Date</b>  | <b>Description of Change</b> |
|------------|--------------|------------------------------|
| A          | Feb 13, 2020 | v1.06 Firmware Release       |
| B          | Jun 4, 2020  | v1.07 Firmware Release       |
| C          | Aug 10, 2021 | v1.15 Firmware Release       |

## Document Applicability

This Modbus map applies to the following products:

| <b>Product ID</b> | <b>Product Description</b> |
|-------------------|----------------------------|
| 865-1000          | XW6048-120/240-60          |
| 865-1000-01       | XW6048-120/240-60          |
| 865-1000-1        | XW6048-120                 |
| 865-1005          | XW4548-120/240-60          |
| 865-1005-1        | XW4548-120-60              |
| 865-1010          | XW4024-120/240-60          |
| 865-1010-1        | XW4024-120-60              |
| 865-1035          | XW6048-230-50              |
| 865-1035-61       | XW6048-230-50              |
| 865-1040          | XW4548-230-50              |
| 865-1040-61       | XW4548-230-50              |
| 865-1045          | XW4024-230-50              |
| 865-1045-61       | XW4024-230-50              |
| 865-4524-01       | XW4524-120/240-60          |
| 865-4524-2        | XW4524-120                 |
| 865-5324-61       | XW5324-230-50              |
| 865-5524-01       | XW5524-120-60              |
| 865-5524-2        | XW5524-120-60              |
| 865-5524-61       | XW5524-230-50              |
| 865-5548-01       | XW5548-120/240-60          |
| 865-5548-2        | XW5548-120                 |
| 865-5548-21       | XWPRO5548-120/240-60       |
| 865-5548-22       | XWPRO5548-120              |
| 865-5548-61       | XWPRO5548-230-50           |
| 865-6848-01       | XW6048-120/240-60          |
| 865-6848-2        | XW6848-120                 |
| 865-6848-21       | XWPRO6848-120/240          |
| 865-6848-22       | XWPRO6848-120              |
| 865-7048-01       | XW7048-120/240-60          |
| 865-7048-2        | XW7048-120-60              |
| 865-7048-55       | XWPRO7048-230-50           |
| 865-7048-61       | XW7048-230-50              |
| 865-8548-01       | XW8548-120/240-60          |
| 865-8548-2        | XW8548-120-60              |
| 865-8548-55       | XWPRO8548-230-50           |
| 865-8548-61       | XW8548-230-50              |

**⚠ WARNING****UNINTENDED OPERATION**

The use of this product with Modbus communications requires expertise in the design, operation, and programming of the device. Only qualified personnel should program, install, alter, and commission this product. Unless specified, information on safety, specifications, installation and operation is as shown in the primary documentation received with the product. Qualified personnel must be familiar with that information before proceeding. When writing values to the device, you must ensure other persons are not working with the device.

**Failure to follow these instructions can result in death or serious injury, and/or equipment damage.**

**⚠ WARNING****LOSS OF CONTROL**

Do not assign the same address to two Modbus devices. The entire serial bus may behave unexpectedly if the master device cannot communicate with all the slave devices on the bus.

**Failure to follow these instructions can result in death or serious injury, and/or equipment damage.**

## Overview

This document describes the structure of the Modbus register address map, which is used to configure, control, and monitor the device. Use this document in conjunction with the device Owner's Guide. The information in this document is intended for use only by qualified personnel who have a detailed technical understanding of the Modbus protocol. The Modbus map is divided into rows of Modbus registers. Each row indicates the Modbus register address, its name, data type, access type, units, scale, offset, and applicable notes as required. External Modbus master devices, such as the Schneider Electric M340 PLC, can read and write the Modbus registers to configure, control, or monitor the device remotely.

## Writing Modbus Registers

Modbus does not provide an error response when data written to a Modbus register is out of range or invalid. To confirm that a Modbus register is correctly written, you should read it back and compare it with the expected value. For descriptions of settings and their valid values, refer to the product's Owner's Guide.

## Supported Modbus Data Types

| Data Type | Description  |
|-----------|--|
| uint16    | unsigned 16-bit integer [0,65535]  |
| sint16    | signed 16-bit integer [-32768,32767]   |
| uint32    | unsigned 32-bit integer [0,4294967295]   |
| sint32    | signed 32-bit integer [-2147483648,2147483647]   |
| str<nn>   | packed 8-bit character string, where <nn> is the length of characters in the string. Two characters are packed into each Modbus register.<br>Example:<br>str20 = 20-character string (packed into 10 Modbus registers)<br>str16 = 16-character string (packed into 8 Modbus registers) |

## Modbus Device Addressing

The Modbus slave address registers are automatically assigned on a first come, first served basis. The first detected device is assigned to the start of the address range. Subsequently added devices are assigned the next available address in the range.

Once assigned, the modbus slave address is associated to the serial number of the device, ensuring the consistency of the modbus address for the lifetime of the installation.

If Modbus slave addresses need to be changed, the Conext Gateway can be reset to its factory defaults and devices added one by one to establish the desired modbus address mapping.

|                            |              |
|----------------------------|--------------|
| ModbusTCP port             | 502          |
| Modbus Slave Address Range | [ 10 .. 29 ] |

## Modbus Register Addressing

The Register Number is the 1-based register identifier. Some 3rd party Modbus tools require 1-based register addressing.

The Register Address is the zero-based register address representing the register address as it is transmitted on-the-wire inside the Modbus data frame.

## Modbus Error Response

The Modbus Server will respond with a 02 ILLEGAL DATA ADDRESS error if an attempt is made to read/write registers which don't exist or if a request is made to read only part of a 32-bit register. This error will also be thrown if a read/write address range contains a data point which does not exist, or if the read/write address range starts or ends halfway through a 32-bit word.

A blank row in the Modbus Register map indicates a boundary between sets of contiguous registers. Multi-register reads/writes across these boundaries will result in a 02 ILLEGAL DATA ADDRESS error

## Modbus Cybersecurity Considerations

### **WARNING**

#### **CYBERSECURITY RISK: POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY**

Always secure the Local Area Network on which the Conext Gateway is connected. Modbus TCP must NEVER be routed over a public network. Use cybersecurity best practices to help prevent unauthorized access.

**Failure to follow these instructions can result in unintended access to sensitive or secure customer data, permanent loss of data, and equipment damage.**

Modbus TCP is a legacy protocol in widespread use within the Solar industry. It is appreciated by system operators due to its simplicity and ease of use in control and monitoring applications. However, Modbus TCP is an insecure protocol which does not provide any data security, encryption, or authentication.

Anyone with access to the local area network on which the Conext Gateway is connected can monitor and control the power conversion devices attached to the Conext Gateway.

Modbus TCP should only be used on trusted, private, and highly secure local area networks for local control and monitoring applications only. Failure to properly secure the Local Area Network on which the Conext Gateway is connected can allow a remote attacker to compromise your power system installation.

## 1 Register Map for Conext™ XW Inverter/Chargers

### Start Marker

| Modbus Address | Name         | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|--------------|--------|-----|-------|-------|--------|-------|
| 40000          | Start Marker | uint32 | r   |       | 1     | 0      |       |

### Common Model

| Modbus Address | Name   | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|--|--------|-----|-------|-------|--------|-------|
| 40002          | Common Model ID  | uint16 | r   |       |       |        |       |
| 40003          | Model Length   | uint16 | r   |       |       |        |       |
| 40004          | Manufacturer Well known value registered with SunSpec for compliance | str32  | r   |       |       |        |       |
| 40020          | Model name of the device   | str32  |     |       |       |        |       |
| 40036          | Options, Manufacturer specific value (16 chars)                      | str16  | r   |       |       |        |       |
| 40044          | Version, Manufacturer specific value (16 chars)                      | str16  | r   |       |       |        |       |
| 40052          | Hardware Serial Number   | str32  | r   |       |       |        |       |
| 40068          | Modbus Slave Address (Port 502)                                      | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40069          | Force even alignment   | uint16 | r   |       |       |        |       |

### Inverter Model

| Modbus Address | Name              | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|-------------------|--------|-----|-------|-------|--------|-------|
| 40070          | Inverter Model ID | uint16 | r   |       |       | 0.0    |       |
| 40071          | Model Length      | uint16 | r   |       |       | 0.0    |       |
| 40072          | AC Current        | uint16 | r   | A     | 0.01  | 0.0    |       |
| 40073          | Phase A Current   | uint16 | r   | A     | 0.01  | 0.0    |       |
| 40074          | Phase B Current   | uint16 | r   | A     | 0.01  | 0.0    |       |
| 40075          | Phase C Current   | uint16 | r   | A     | 0.01  | 0.0    |       |

| Modbus Address | Name  | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|---|--------|-----|-------|-------|--------|-------|
| 40076          | Inverter-charger power module AC current Scaling factor     | sint16 | r   |       | 1.0   | 0.0    |       |
| 40077          | Inverter-charger power module phase voltage                 | uint16 | r   | V     | 1.0   | 0.0    |       |
| 40078          | Inverter-charger power module phase voltage                 | uint16 | r   | V     | 1.0   | 0.0    |       |
| 40079          | Inverter-charger power module phase voltage                 | uint16 | r   | V     | 1.0   | 0.0    |       |
| 40080          | Phase Voltage AN  | uint16 | r   | V     | 1.0   | 0.0    |       |
| 40081          | Phase Voltage BN  | uint16 | r   | V     | 1.0   | 0.0    |       |
| 40082          | Phase Voltage CN  | uint16 | r   | V     | 1.0   | 0.0    |       |
| 40083          | Inverter-charger power module phase voltage scaling factor  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40084          | Transformer invert power +ve is inverting                   | sint16 | r   | W     | 1.0   | 0.0    |       |
| 40085          | Inverter-charger power module total AC power scaling factor | sint16 | r   |       | 1.0   | 0.0    |       |
| 40086          | Transformer measured frequency                              | uint16 | r   | Hz    | 0.01  | 0.0    |       |
| 40087          | Frequency scaling factor                                    | sint16 | r   |       | 1.0   | 0.0    |       |
| 40088          | Inverter-charger power module apparent power                | sint16 | r   | VA    | 1.0   | 0.0    |       |
| 40089          | Inverter-charger power module apparent power scaling factor | sint16 | r   |       | 1.0   | 0.0    |       |
| 40090          | AC Reactive Power   | sint16 | r   | var   | 1.0   | 0.0    |       |
| 40091          | Inverter-charger power module VAR scale factor              | sint16 | r   |       | 1.0   | 0.0    |       |
| 40092          | Inverter-charger power module power factor                  | sint16 | r   | Pct   | 1.0   | 0.0    |       |

| Modbus Address | Name  | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|---|--------|-----|-------|-------|--------|-------|
| 40093          | Inverter-charger power module power factor scaling factor | sint16 | r   |       | 1.0   | 0.0    |       |
| 40094          | Energy at the XFMR Lifetime                               | uint32 | r   | kWh   | 0.001 | 0.0    |       |
| 40096          | Inverter-charger power module energy scaling factor       | sint16 | r   |       | 1.0   | 0.0    |       |
| 40097          | Inverter-charger power module DC current                  | uint16 | r   | A     | 1.0   | 0.0    |       |
| 40098          | Inverter-charger power module DC current scaling factor   | sint16 | r   |       | 1.0   | 0.0    |       |
| 40099          | Inverter-charger power module DC voltage                  | uint16 | r   | V     | 1.0   | 0.0    |       |
| 40100          | Inverter-charger power module DC voltage scaling factor   | sint16 | r   |       | 1.0   | 0.0    |       |
| 40101          | Inverter-charger power module DC power                    | sint16 | r   | W     | 1.0   | 0.0    |       |
| 40102          | Inverter-charger power module DC power scaling factor     | sint16 | r   |       | 1.0   | 0.0    |       |
| 40103          | Cabinet Temperature                                       | sint16 | r   | degC  | 1.0   | 0.0    |       |
| 40104          | Heat Sink Temperature                                     | sint16 | r   | degC  | 1.0   | 0.0    |       |
| 40105          | Inverter-charger power module Transformer Temperature     | sint16 | r   | C     | 1.0   | 0.0    |       |
| 40106          | Inverter-charger power module Other Temperature           | sint16 | r   | C     | 1.0   | 0.0    |       |
| 40107          | Inverter-charger power module Temperature scaling factor  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40108          | Enumerated value. Operating state                         | uint16 | r   |       | 1.0   | 0.0    |       |

| Modbus Address | Name   | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|--|--------|-----|-------|-------|--------|-------|
| 40109          | Inverter-charger power module vendor operating state | uint16 | r   |       | 1.0   | 0.0    |       |
| 40110          | Bitmask value. Event fields                          | uint32 | r   |       | 1.0   | 0.0    |       |
| 40112          | Reserved for future use                              | uint32 | r   |       | 1.0   | 0.0    |       |
| 40114          | Vendor defined events                                | uint32 | r   |       | 1.0   | 0.0    |       |
| 40116          | Vendor defined events                                | uint32 | r   |       | 1.0   | 0.0    |       |
| 40118          | Vendor defined events                                | uint32 | r   |       | 1.0   | 0.0    |       |
| 40120          | Vendor defined events                                | uint32 | r   |       | 1.0   | 0.0    |       |

### Nameplate Model

| Modbus Address | Name  | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|---|--------|-----|-------|-------|--------|-------|
| 40122          | Nameplate Model ID  | uint16 | r   |       | 1.0   | 0.0    |       |
| 40123          | Nameplate Model Length  | uint16 | r   |       | 1.0   | 0.0    |       |
| 40124          | Type of DER device. Default value is 4 to indicate PV device. | uint16 | r   |       | 1.0   | 0.0    |       |
| 40125          | Continuous power output capability of the inverter - Max      | uint16 | r   | W     | 1.0   | 0.0    |       |
| 40126          | Scale factor  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40127          | Continuous Volt-Ampere capability of the inverter.            | uint16 | r   |       | 1.0   | 0.0    |       |
| 40128          | Scale factor  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40129          | Continuous VAR capability of the inverter in quadrant 1.      | sint16 | r   |       | 1.0   | 0.0    |       |
| 40130          | Continuous VAR capability of the inverter in quadrant 2.      | sint16 | r   |       | 1.0   | 0.0    |       |
| 40131          | Continuous VAR capability of the inverter in quadrant 3.      | sint16 | r   |       | 1.0   | 0.0    |       |

| Modbus Address | Name  | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|---|--------|-----|-------|-------|--------|-------|
| 40132          | Continuous VAR capability of the inverter in quadrant 4 - Max   | sint16 | r   | var   | 1.0   | 0.0    |       |
| 40133          | Scale factor  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40134          | Maximum RMS AC current level capability of the inverter - Max   | uint16 | r   | A RMS | 0.01  | 0.0    |       |
| 40135          | Scale factor  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40136          | Minimum power factor capability of the inverter in quadrant 1.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40137          | Minimum power factor capability of the inverter in quadrant 2.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40138          | Minimum power factor capability of the inverter in quadrant 3.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40139          | Minimum power factor capability of the inverter in quadrant 4.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40140          | Scale factor  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40141          | Nominal energy rating of storage device.  | uint16 | r   |       | 1.0   | 0.0    |       |
| 40142          | Scale factor  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40143          | The useable capacity of the battery. Maximum charge minus minimum charge from a technology capability perspective (Amp-hour capacity rating). | uint16 | r   |       | 1.0   | 0.0    |       |
| 40144          | Scale factor for amp-hour rating.   | sint16 | r   |       | 1.0   | 0.0    |       |
| 40145          | Maximum rate of energy transfer into the storage device - Min   | sint16 | r   | W     | 1.0   | 0.0    |       |
| 40146          | Scale factor  | sint16 | r   |       | 1.0   | 0.0    |       |

| Modbus Address | Name   | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|--|--------|-----|-------|-------|--------|-------|
| 40147          | Maximum rate of energy transfer out of the storage device. | uint16 | r   |       | 1.0   | 0.0    |       |
| 40148          | Scale factor   | sint16 | r   |       | 1.0   | 0.0    |       |
| 40149          | Pad register.  | uint16 | r   |       | 1.0   | 0.0    |       |

### Basic Settings Model

| Modbus Address | Name   | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|--|--------|-----|-------|-------|--------|-------|
| 40150          | Basic Settings Model ID  | uint16 | r   |       | 1.0   | 0.0    |       |
| 40151          | Basic settings Model Length  | uint16 | r   |       | 1.0   | 0.0    |       |
| 40152          | EPC Maximum Discharge Power  | uint16 | rw  | W     | 1.0   | 0.0    |       |
| 40153          | Static Operating Reference Voltage                                     | uint16 | rw  | V     | 0.01  | 0.0    |       |
| 40154          | Nominal Operating Voltage Offset                                       | sint16 | rw  | V     | 0.01  | 0.0    |       |
| 40155          | Setpoint for maximum voltage.  | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40156          | Setpoint for minimum voltage.  | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40157          | Setpoint for maximum apparent power. Default to VARtg.                 | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40158          | Setting for maximum reactive power in quadrant 1. Default to VArRtgQ1. | sint16 | rw  |       | 1.0   | 0.0    |       |
| 40159          | Setting for maximum reactive power in quadrant 2. Default to VArRtgQ2. | sint16 | rw  |       | 1.0   | 0.0    |       |
| 40160          | Setting for maximum reactive power in quadrant 3. Default to VArRtgQ3. | sint16 | rw  |       | 1.0   | 0.0    |       |

| Modbus Address | Name   | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|--|--------|-----|-------|-------|--------|-------|
| 40161          | Setting for maximum reactive power in quadrant 4. Default to VArRtgQ4.                           | sint16 | rw  |       | 1.0   | 0.0    |       |
| 40162          | Default ramp rate of change of active power due to command or internal action.                   | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40163          | Setpoint for minimum power factor value in quadrant 1. Default to PFRtgQ1.                       | sint16 | rw  |       | 1.0   | 0.0    |       |
| 40164          | Setpoint for minimum power factor value in quadrant 2. Default to PFRtgQ2.                       | sint16 | rw  |       | 1.0   | 0.0    |       |
| 40165          | Setpoint for minimum power factor value in quadrant 3. Default to PFRtgQ3.                       | sint16 | rw  |       | 1.0   | 0.0    |       |
| 40166          | Setpoint for minimum power factor value in quadrant 4. Default to PFRtgQ4.                       | sint16 | rw  |       | 1.0   | 0.0    |       |
| 40167          | VAR action on change between charging and discharging: 1=switch 2=maintain VAR characterization. | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40168          | Calculation method for total apparent power. 1=vector 2=arithmetic.                              | uint16 | rw  |       | 1.0   | 0.0    |       |

| Modbus Address | Name  | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|---|--------|-----|-------|-------|--------|-------|
| 40169          | Setpoint for maximum ramp rate as percentage of nominal maximum ramp rate. This setting will limit the rate that watts delivery to the grid can increase or decrease in response to intermittent PV generation. | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40170          | Setpoint for nominal frequency at the ECP.  | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40171          | Identity of connected phase for single phase inverters. A=1 B=2 C=3.  | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40172          | Scale factor for real power.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40173          | Scale factor for voltage at the PCC.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40174          | Scale factor for offset voltage.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40175          | Scale factor for min/max voltages.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40176          | Scale factor for apparent power.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40177          | Scale factor for reactive power.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40178          | Scale factor for default ramp rate.   | sint16 | r   |       | 1.0   | 0.0    |       |
| 40179          | Scale factor for minimum power factor.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40180          | Scale factor for maximum ramp percentage.   | sint16 | r   |       | 1.0   | 0.0    |       |
| 40181          | Scale factor for nominal frequency.   | sint16 | r   |       | 1.0   | 0.0    |       |

**Immediate Controls Model**

| <b>Modbus Address</b> | <b>Name</b>   | <b>Type</b> | <b>R/W</b> | <b>Units</b> | <b>Scale</b> | <b>Offset</b> | <b>Notes</b>            |
|-----------------------|---|-------------|------------|--------------|--------------|---------------|-------------------------|
| 40182                 | Immediate Controls Model ID                                 | uint16      | r          |              | 1.0          | 0.0           |                         |
| 40183                 | Immediate Controls Model Length                             | uint16      | r          |              | 1.0          | 0.0           |                         |
| 40184                 | Time Window for connect/disconnect                          | uint16      | rw         |              | 1.0          | 0.0           |                         |
| 40185                 | Timeout period for connect/disconnect                       | uint16      | rw         |              | 1.0          | 0.0           |                         |
| 40186                 | External command to connect or disconnect XW                | uint16      | rw         |              | 1.0          | 0.0           |                         |
| 40187                 | Set power output to specified level.                        | uint16      | r          | %            | 0.01         |               |                         |
| 40188                 | Time window for power limit change                          | uint16      | rw         |              | 1.0          | 0.0           |                         |
| 40189                 | Timeout period for power limit                              | uint16      | rw         |              | 1.0          | 0.0           |                         |
| 40190                 | Ramp time for moving from current setpoint to new setpoint. | uint16      | rw         |              | 1.0          | 0.0           |                         |
| 40191                 | Enumerated valued. Throttle enable/disable control.         | uint16      | r          |              |              |               | 0=Disabled<br>1=Enabled |
| 40192                 | Power Factor  | sint8       | rw         |              | 0.01         | 0.0           |                         |
| 40193                 | Time window for power factor change                         | uint16      | rw         |              | 1.0          | 0.0           |                         |
| 40194                 | Timeout period for power factor                             | uint16      | rw         |              | 1.0          | 0.0           |                         |
| 40195                 | Ramp time for moving from current setpoint to new setpoint. | uint16      | rw         |              | 1.0          | 0.0           |                         |
| 40196                 | Power Factor Target Enable/Disable                          | uint16      | rw         |              | 1.0          | 0.0           | 0=Disabled<br>1=Enabled |
| 40197                 | Reactive Power in percent of Wmax                           | sint16      | rw         |              | 1.0          | 0.0           |                         |
| 40198                 | Reactive Power in percent of VArMax                         | sint16      | rw         | %            | 0.01         | 0.0           |                         |

| Modbus Address | Name  | Type   | R/W | Units | Scale | Offset | Notes                   |
|----------------|---|--------|-----|-------|-------|--------|-------------------------|
| 40199          | Reactive Power in percent of VArAval                        | sint16 | rw  |       | 1.0   | 0.0    |                         |
| 40200          | Time window for VAR limit change                            | uint16 | rw  |       | 1.0   | 0.0    |                         |
| 40201          | Timeout period for VAR limit                                | uint16 | rw  |       | 1.0   | 0.0    |                         |
| 40202          | Ramp time for moving from current setpoint to new setpoint. | uint16 | rw  |       | 1.0   | 0.0    |                         |
| 40203          | VAR percent limit mode                                      | uint16 | rw  |       | 1.0   | 0.0    | See section 2.1         |
| 40204          | Percent limit Var enable/disable control                    | uint16 | rw  |       | 1.0   | 0.0    | 0=Disabled<br>1=Enabled |
| 40205          | Scale factor for WMaxLimPct                                 | sint16 | r   |       | 1.0   | 0.0    |                         |
| 40206          | Scale factor for OutPFSet                                   | sint16 | r   |       | 1.0   | 0.0    |                         |
| 40207          | Scale factor for VArPct                                     | sint16 | r   |       | 1.0   | 0.0    |                         |

### Storage Settings Model

| Modbus Address | Name                                      | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|---|--------|-----|-------|-------|--------|-------|
| 40208          | Storage Settings Model ID                 | uint16 | r   |       | 1.0   | 0.0    |       |
| 40209          | Storage settings Model Length             | uint16 | r   |       | 1.0   | 0.0    |       |
| 40210          | EPC Maximum Charge Power                  | uint16 | rw  | W     | 1.0   | 0.0    |       |
| 40211          | Reference max rate of change charge power | uint16 | rw  | %/s   | 0.1   | 0.0    |       |
| 40212          | Normal Power Ramp Rate                    | uint16 | rw  | %/s   | 0.1   | 0.0    |       |
| 40213          | External power control command            | uint8  | rw  |       | 1.0   | 0.0    |       |
| 40214          | Setpoint for maximum charging VA.         | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40215          | Grid Support SOC                          | sint16 | rw  | %     | 0.01  | 0.0    |       |

| Modbus Address | Name   | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|--|--------|-----|-------|-------|--------|-------|
| 40216          | Currently available energy as a percent of the capacity rating.                              | uint16 | r   |       | 1.0   | 0.0    |       |
| 40217          | State of charge (ChaState) minus storage reserve (MinRsvPct) times capacity rating (AhrRtg). | uint16 | r   |       | 1.0   | 0.0    |       |
| 40218          | Internal battery voltage.  | uint16 | r   |       | 1.0   | 0.0    |       |
| 40219          | Charge status of storage device. Enumerated value.   | uint16 | r   |       | 1.0   | 0.0    |       |
| 40220          | EPC Maximum Discharge Power Percent  | uint16 | rw  | %     | 0.01  | 0.0    |       |
| 40221          | EPC Maximum Charge Power Percent   | uint16 | rw  | %     | 0.01  | 0.0    |       |
| 40222          | Time window for charge/discharge rate change.  | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40223          | Timeout period for charge/discharge rate.  | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40224          | Ramp time for moving from current setpoint to new setpoint.                                  | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40225          | Storage Settings - ChaGriSet   | uint16 | rw  |       | 1.0   | 0.0    |       |
| 40226          | Scale factor for maximum charge.   | sint16 | r   |       | 1.0   | 0.0    |       |
| 40227          | Scale factor for maximum charge and discharge rate.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40228          | Scale factor for maximum charging VA.  | sint16 | r   |       | 1.0   | 0.0    |       |
| 40229          | Scale factor for minimum reserve percentage.   | sint16 | r   |       | 0.01  | 0.0    |       |

| Modbus Address | Name  | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|---|--------|-----|-------|-------|--------|-------|
| 40230          | Scale factor for available energy percent.      | sint16 | r   |       | 1.0   | 0.0    |       |
| 40231          | Scale factor for state of charge.               | sint16 | r   |       | 1.0   | 0.0    |       |
| 40232          | Scale factor for battery voltage.               | sint16 | r   |       | 1.0   | 0.0    |       |
| 40233          | Scale factor for percent charge/discharge rate. | sint16 | r   |       | 1.0   | 0.0    |       |

### Custom model map number

| Modbus Address | Name                                   | Type   | R/W | Units | Scale | Offset | Notes                    |
|----------------|--|--------|-----|-------|-------|--------|--------------------------|
| 40234          | Custom model map number                | uint16 | r   |       |       |        |                          |
| 40235          | Custom model map len                   | uint16 | r   |       |       |        |                          |
| 40236          | Energy at the XFMR Lifetime - charging | uint32 | r   | kWh   | 0.001 | 0.0    |                          |
| 40238          | Max chage power                        | uint16 | r   | W     | 1.0   | 0.0    |                          |
| 40239          | Max discharge power                    | uint16 | r   | W     | 1.0   | 0.0    |                          |
| 40240          | Wmax scaling factor                    | uint16 | r   |       | 1.0   | 0.0    |                          |
| 40241          | Operating Mode                         | uint16 | rw  |       | 1.0   | 0.0    | 2=Standby<br>3=Operating |
| 40242          | Battery sensor count                   | uint16 | r   |       | 1.0   | 0.0    |                          |
| 40243          | Battery sensor config mode             | uint16 | rw  |       | 1.0   | 0.0    |                          |
| 40244          | Inverter clear fault command           | uint16 | rw  |       | 1.0   | 0.0    |                          |
| 40245          | AC PV Charge SOC Limit                 | uint16 | rw  | %     | 0.01  | 0.0    |                          |
| 40246          | High SOC Cut Out                       | sint16 | rw  | %     | 0.01  | 0.0    |                          |
| 40247          | Recharge SOC                           | sint16 | rw  | %     | 0.01  | 0.0    |                          |
| 40248          | Low SOC Cut Out                        | sint16 | rw  | %     | 0.01  | 0.0    |                          |
| 40249          | SOC scaling factor                     | uint16 | r   |       | 1.0   | 0.0    |                          |

| Modbus Address | Name   | Type   | R/W | Units | Scale | Offset | Notes  |
|----------------|--|--------|-----|-------|-------|--------|--|
| 40250          | Fail-over action on loss of SunSpec Controller heartbeat | uint8  | rw  |       | 1.0   | 0.0    | 0=Heartbeat Disabled<br>1=Do Nothing<br>2=Autonomous Operation<br>3=AC Passthrough |
| 40251          | Battery Association                                      | uint16 | rw  |       | 1.0   | 0.0    | See section 2.2  |
| 40252          | Inverter Status  | uint16 | r   |       | 1.0   | 0.0    | See section 2.3  |
| 40253          | Charger Status   | uint16 | r   |       | 1.0   | 0.0    | See section 2.4  |
| 40254          | Reset  | uint16 | rw  |       | 1.0   | 0.0    | 0=Reboot<br>2=Reset User Settings to Factory<br>5=Reset All Settings to Factory    |
| 40255          | AC2 Voltage  | uint32 | r   | V     | 0.001 | 0.0    |  |
| 40257          | AC2 L1 Voltage   | uint32 | r   | V     | 0.001 | 0.0    |  |
| 40259          | AC2 L2 Voltage   | uint32 | r   | V     | 0.001 | 0.0    |  |
| 40261          | Backup Mode  | uint16 | rw  |       | 1.0   | 0.0    | 0=Disabled<br>1=Enabled  |

### End Marker

| Modbus Address | Name         | Type   | R/W | Units | Scale | Offset | Notes |
|----------------|--------------|--------|-----|-------|-------|--------|-------|
| 40262          | End Marker   | uint16 | r   |       | 1     | 0      |       |
| 40263          | End Marker 0 | uint16 | r   |       | 1     | 0      |       |

## 2 Data Point Enumerations

### 2.1 VAR percent limit mode

0=None  
1=Wmax  
2=VArMax  
3=VArAval

## 2.2 DC Input/Output Association

The following associations are supported:

3=House Battery Bank 1  
4=House Battery Bank 2  
5=House Battery Bank 3  
6=House Battery Bank 4  
7=House Battery Bank 5

## 2.3 Inverter Status

The Conext XW Inverter may operate in one of the following modes:

1024=Invert  
1025=AC Pass Through  
1026=APS Only  
1027=Load Sense  
1028=Inverter Disabled  
1029=Load Sense Ready  
1030=Engaging Inverter  
1031=Invert Fault  
1032=Inverter Standby  
1033=Grid-Tied  
1034=Grid Support  
1035=Gen Support  
1036=Sell-to-Grid  
1037=Load Shaving  
1038=Grid Frequency Stabilization  
1039=AC Coupling  
1040=Reverse lbatt

## 2.4 Charger Status

The Conext XW Charger may operate in one of the following modes:

768=Not Charging  
769=Bulk  
770=Absorption  
771=Overcharge  
772=Equalize  
773=Float  
774=No Float  
775=Constant VI  
776=Charger Disabled  
777=Qualifying AC  
778=Qualifying APS  
779=Engaging Charger  
780=Charge Fault  
781=Charger Suspend  
782=AC Good  
783=APS Good  
784=AC Fault  
785=Charge  
786=Absorption Exit Pending  
787=Ground Fault  
788=AC Good Pending