

Conext™ Gateway

Modbus Interface Specification (503)

Conext™ System Control Panel (SCP)

990-6272A

Feb 13, 2020



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Contact Information

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Revision History

Rev	Date	Description of Change
A	Feb 13, 2020	v1.06 Firmware Release

Document Applicability

This Modbus map applies to the following products:

Product ID	Product Description
809-0921	System Control Panel
865-1050	System Control Panel
865-1050-01	System Control Panel

⚠ 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. Example: str20 = 20-character string (packed into 10 Modbus registers) 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	503
Modbus Slave Address Range	[70 .. 89]

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™ System Control Panel (SCP)

Reg. No.	Reg. Addr.	Name	Type	R/W	Units	Scale	Offset	Notes
1	0x0000	Device Name	str16	r				
9	0x0008	reserved	uint16	r				
10	0x0009	reserved	uint16	r				
11	0x000A	FGA Number	str20	r				
21	0x0014	Unique ID Number	uint32	r				
31	0x001E	Firmware Version	uint32	r				
41	0x0028	Modbus Slave Address (Port 503)	uint16	rw		1.0	0.0	
42	0x0029	Device Number	uint16	r		1.0	0.0	
43	0x002A	System Instance	uint16	r		1.0	0.0	
44	0x002B	Hardware Serial Number	str20	r				
54	0x0035	Configuration Status	uint16	r		1.0	0.0	0=Refreshing 1=Done
55	0x0036	Configuration Refresh Counter	uint32	r		1.0	0.0	
65	0x0040	Device State	uint16	r		1.0	0.0	See section 2.1
66	0x0041	Device Present	uint16	r		1.0	0.0	0=Inactive (all data invalid) 1=Active (data valid)
67	0x0042	Active Faults Flag	uint16	r		1.0	0.0	0=No Active Faults 1=Has Active Faults
68	0x0043	Active Warnings Flag	uint16	r		1.0	0.0	0=No Warnings 1=Unit has active Warnings
69	0x0044	Fault Bitmap 0	uint16	r		1.0	0.0	See section 2.2
70	0x0045	Warning Bitmap 0	uint16	r		1.0	0.0	See section 2.3
71	0x0046	Configuration Errors	uint32	r		1.0	0.0	
73	0x0048	Reset	uint16	rw		1.0	0.0	0=Reboot 2=Reset to Factory

Reg. No.	Reg. Addr.	Name	Type	R/W	Units	Scale	Offset	Notes
74	0x0049	Operating Mode	uint16	rw		1.0	0.0	2=Standby 3=Operating
75	0x004A	Clear	uint16	rw		1.0	0.0	See section 2.4
76	0x004B	Display Brightness	uint16	rw		1.0	0.0	
77	0x004C	Display Contrast	uint16	rw		1.0	0.0	
78	0x004D	Backlight Timeout	uint16	rw		1.0	0.0	
79	0x004E	Button Beep	uint16	rw		1.0	0.0	0=Disabled 1=Enabled
80	0x004F	Fault Alarm	uint16	rw		1.0	0.0	0=Disabled 1=Enabled
81	0x0050	Set Degrees	uint16	rw		1.0	0.0	0=Fahrenheit 1=Celsius
82	0x0051	Time Format	uint16	rw		1.0	0.0	0=AM/PM 1=24-Hour
83	0x0052	Identify Enable	uint16	rw		1.0	0.0	0=Disabled 1=Enabled
84	0x0053	Refresh Configuration Data	uint16	rw		1.0	0.0	1=Refresh

2 Data Point Enumerations

2.1 Operating State

The Operating state can be one of the following:

0=Hibernate
 1=Power Save
 2=Safe Mode
 3=Operating
 4=Diagnostic Mode
 5=Remote Power Off
 255=Data Not Available

2.2 Fault Bits

The SCP can report one or more of the following faults:

bit0=F250 System clock not set
bit1=F251 A device is lost
bit2=F252 New device detected
bit3=F500 Internal failure
bit4=F501 Memory failure
bit5=F503 Internal reset
bit6=F504 Lost network connection
bit7=F505 Internal failure

2.3 Warning Bits

The SCP can report one or more of the following warnings:

bit0=W250 The value failed to change
bit1=W251 User confirm prompt: Equalization process
bit2=W252 User confirm prompt: Restore default settings
bit3=W254 The value failed to change
bit4=W255 System clock not set
bit5=W256 A device is lost
bit6=W257 New device detected
bit7=W258 Device instance is duplicated
bit8=W298 Caution: changing frequency can damage loads
bit9=W501 SCP has fixed a memory problem - restored defaults

2.4 Clear Command

The Clear Command can be used to clear the fault; warning; event; and communication logs. The following values are supported:

1=Fault Log
2=Active Faults
4=Warning Log
8=Active Warnings
16=State Event Log
32=Communication Statistics
64=Statistics

128=User Statistics

255=All