TECHNICAL DOCUMENT

MODBUS TCP Resister Map SureWave SFC

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PREPARED		STATUS	SECURITY LEVEL		
2023-11-27	Jorge Unamo	Approved	Public		
APPROVED		DOCUMENT TYPE			
2023-12-05	Paul Frisby	Technical Document			
OWNING ORGANIZATION		DOCUMENT NO.	REV.	LANG.	PAGE
Power Conditioning Products		2UCD420000E005	b	en	1/6

1. Purpose and Basic Description

This document presents the Modbus TCP communication registers map of the SureWave SFC. The system integrator shall take full responsibility and ensure all the specifications defined in this document are fulfilled in order to allow correct operation of the SFC.

2. Cyber Security Requirements

Refer to the SureWave SFC User Manual document 2UCD420000E001 for further information about the Cyber Security requirements.

3. MODBUS TCP Register List

The different tables below show the list of registers, data type, access rights, range, and units.

3.1. System level

Register	MODBUS TYPE	Scaling	Access RW	Unit	Description
20005	int16	1	R	V	System nominal output voltage (RMS L-L)
20006	int16	1	R	A	System nominal output current (RMS)
20007	int16	10	R	Hz	System nominal output frequency
20008	uint16	1	R		Condensed system status
20009	uint16	1	R		Detailed system status
20010	uint16	100	R	%	System Availability
20011	int16	1	R	V	Measured system input voltage (RMS L1-L2)
20012	int16	1	R	V	Measured system input voltage (RMS L2-L3)
20013	int16	1	R	V	Measured system input voltage (RMS L3-L1)
20014	int16	1	R	V	Measured system output voltage (RMS L1-L2)
20015	int16	1	R	V	Measured system output voltage (RMS L2-L3)
20016	int16	1	R	V	Measured system output voltage (RMS L3-L1)
20017	int16	1	R	A	Measured system input current (RMS U)
20018	int16	1	R	A	Measured system input current (RMS V)
20019	int16	1	R	A	Measured system input current (RMS W)
20020	int16	1	R	A	Measured system output current (RMS U)
20021	int16	1	R	A	Measured system output current (RMS V)
20022	int16	1	R	A	Measured system output current (RMS W)
20023	int16	10	R	Hz	Measured system input frequency
20024	int16	10	R	Hz	Measured system output frequency
20025	int16	1	R	kW	Measured system input real power
20026	int16	1	R	kVA	Measured system input reactive power
20027	int16	1	R	kW	Measured system output real power
20028	int16	1	R	kVA	Measured system output reactive power

3.2. SFC status (Volatile)

Register	MODBUS TYPE	Scaling	Access RW	Unit	Description
25000	uint16	1	R		Remote Status bitfield 1=active, 0=ignore 0000 0000 0000 0001 = Running 0000 0000 0000 0010 = Ready 0000 0000 0000 0100 = Warning 0000 0000 0000 1000 = Tripped 0000 0000 0001 0000 = Synchronized 0000 0000 0010 0000 = Loaded 0000 0000 0100 0000 = Overload
25501	uint16	1	R		Digital monitoring status (Customer DI-A) 0 = Healthy 1 = Warning (comms loss) 2 = Faulted
25502	uint16	1	R		Digital monitoring status (Customer DI-B) 0 = Healthy 1 = Warning (comms loss) 2 = Faulted
25503	int16	1	R	V	Measured voltage external sensor (RMS L1-L2)
25504	int16	1	R	V	Measured voltage external sensor (RMS L2-L3)
25505	int16	1	R	V	Measured voltage external sensor (RMS L3-L1)
25506	int16	1	R	A	Measured current external sensor (RMS U)
25507	int16	1	R	A	Measured current external sensor (RMS V)
25508	int16	1	R	A	Measured current external sensor (RMS W)
25509	int16	10	R	Hz	Measured frequency external sensor
25510	int16	10	R	degree	Measured phase difference to external sensor

3.3. Configuration Parameters (Non-volatile)

Register	MODBUS TYPE	Scaling	Access RW	Unit	Description
30001	uint16	10	RW	%	Output voltage droop at nominal reactive
30002	uint16	10	RW	%	Output frequency droop at nominal real
30003	int16	1	RW	%	Maximum output real power limit (posi-
30004	int16	1	RW	%	Maximum output real power limit (nega-
30005	int16	1	RW	%	Maximum output reactive power limit
30006	int16	1	RW	%	Maximum output reactive power limit

3.4. Setpoints (Volatile)

Register	MODBUS TYPE	Scaling	Access RW	Unit	Description
30201	uint16	1	RW		Remote Command bitfield 1=active, 0=ignored 0000 0000 0000 0001 = Start 0000 0000 0000 0010 = Soft Stop 0000 0000 0000 0100 = Reset 0000 0000 0000 1000 = Droop Enable 0000 0000 0001 0000 = Load Enable 0000 0000 0010 0000 = Synchronize 0000 0000 0100 0000 = Fix Power
30202	uint16	100	RW	%	Output voltage setpoint (% of nominal)
30203	uint16	100	RW	%	Output frequency setpoint (% of nominal)
30204	int16	10	RW	%	Output real power setpoint (% of nominal)
30205	int16	10	RW	%	Output reactive power setpoint (% of nominal)

4. Examples for writing and reading registers

4.1. Writing to a Modbus register

1) Writing to register 30205, the output reactive power setpoint.
The register is of data type int16, so it will accept positive and negative values. It has a scaling factor of 10. This implies a precision of 0.1, or 1 digit. Let's write a setpoint of -40.5%. To attempt this, we have to send -405 (or -40.5*10 (scaling factor)) to register 30205.

2) Writing to register 30202, the output voltage setpoint.
The register is of data type uint16, so it will only accept positive values. It has a scaling factor of 100. This implies a precision of 0.01, or 2 digits. Let's write a setpoint of 81.35%. To attempt this, we have to send 8135 (or 81.35*100 (scaling factor)) to register 30202.

4.2. Reading a Modbus register

1) Reading register 25509, the measured frequency of the external sensor.
The register is of data type int16, so it will provide positive and negative values. It has a scaling factor of 10. This implies a precision of 0.1, or 1 digit. Let's read the register and suppose we get back 246. To convert it to the correct unit, we have to divide by the scaling factor, which is 246/10 (scaling factor) = 24.6 Hz.

2) Reading register 20028, the reactive power.
The register is of data type int16, so it will provide positive and negative values. It has a scaling factor of 1. This implies a precision of 0 digits. Let's read the register and suppose we get back 53. To convert it to the correct unit, we have to divide by the scaling factor, which is 53/1 (scaling factor) = 53 kVA.