Sentinel 300P series

Automatic switch mode battery chargers

MODBUS® register description, firmware V007.1 (2015-03-19)

yi6515
2017-03-21
catalogue section 75

MURPHY by ENOVATION CONTROLS

MODBUS® registers

Node Address: The default node address of the SNTL300-P is 100

Register	Description	Units	Data range	Bit resolution	Data offset	Notes
40001	Measured battery voltage	V x10	0.0 ~ 40.0	0.1	0	
40002	Charger output current	A x10	0.0 ~ 12.0	0.1	0	
40003	Charger status register	n/a	0x0000 ~ 0x0019	1	0	**See table 1**
40004	DIP switch setting	n/a	0x00 ~ 0x3F	1	0	**See table 2 and 2a**
40005	Temperature – Internal	°C	-12 ~ 51	1	-12	
40006	Temperature – External	°C	-12 ~ 51	1	-12	
40007	Target Float Voltage	V x10	0.0 ~ 40.0	0.1	0	
40008	Boost Initiate Voltage	V x10	0.0 ~ 40.0	0.1	0	
40009	Target boost Voltage	V x10	0.0 ~ 40.0	0.1	0	
40010	Total Boost period	Secs	0 ~ 65534	1	0	
40011	Low Alarm Voltage	V x10	0.0 ~ 40.0	0.1	0	
40012	High Alarm Voltage	V x10	0.0 ~ 40.0	0.1	0	
40013	AC on time MSB	Minutes	0 ~ 65535	1	0	
40014	AC on time LSB	Minutes	0 ~ 65535	1	0	
40015	Charge time MSB	Minutes	0 ~ 65535	1	0	
40016	Charge time LSB	Minutes	0 ~ 65535	1	0	
40017	Remaining boost time	Secs	0 ~ 65535	1	0	
40018	Fault status	n/a	0x0000 ~ 0x07FF	1	0	**See table 3**
40019	Charger PWM value	n/a	0 ~ 1023	1	0	
40020	Lamp status	n/a				
40021	RTC minutes / seconds	MSB = minute LSB = seconds				
40022	RTC date / hours	MSB = date LSB = hours				
40023	RTC month / year	MSB = year LSB = Month				(if month > 12, date format = dd:mm else date format = mm:dd)
40024	24V lock-in time	n/a	0 ~ 65535	1	0	
40025	Number of cells	n/a	0 (disabled) 1- 30	1	0	
Diagnostic Registers: CAL mode READ registers						
40041	Raw ADC value for current	n/a	0 ~ 1023	1	0	
40042	Raw ADC value for battery V	n/a	0 ~ 1023	1	0	
40043	Measured battery voltage	V x10	0.0 ~ 40.0	0.1	0	
40044	Measured output current	A x10	0.0 ~ 12.0	0.1	0	
40045	Read CAL mode PWM value	n/a	0 ~ 1023	1	0	
40046	Voltage CAL factor X 1000	n/a	0 ~ 65535	1	0	
Diagnostic Registers: CAL mode WRITE registers						
40050	Write CAL mode PWM value	n/a	0 ~ 1023	1	0	
40051	CAL output control register	n/a	bit 0: 0 = Output FET off 1 = Output FET on	1	0	
40052	Current CAL ADC value @ I =0	n/a	0 ~ 1023	1	0	
40053	Current CAL ADC value @ I =Load	n/a	0 ~ 1023	1	0	
40054	Current CAL: Iload value	A x10	0.0 ~ 10.0	0.1	0	
40055	Voltage CAL: calibration voltage	V x10	0.0 ~ 40.0	0.1	0	
40056	Maximum internal temperature reached	°C	-12 ~ 51	1	-12	
40060	Calibration Password submit register	n/a	0x0000 ~ 0xFFFF	1	0	
40061	Charger-mode setup.	n/a				
40062	Reset AC-on hours count	n/a	0xA5A5 = reset active			
40063	Reset charger hours count	n/a	0xA5A5 = reset active			

Register	Description	Units	Data range	Bit resolution	Data offset	Notes
Diagnostic Registers: CAL mode WRITE registers (cont.)						
40064	Remote profile: Float voltage	V x10	0.0 ~ 40.0	0.1	0	
40065	Remote profile: Boost voltage X 10	V x10	0.0 ~ 40.0	0.1	0	
40066	Remote profile: Boost initiate voltage X 10	V x10	0.0 ~ 40.0	0.1	0	
40067	Remote profile: SPARE					
40068	Remote profile: Low alarm voltage X 10	V x10	0.0 ~ 40.0	0.1	0	
40069	Remote profile: High alarm voltage X 10	V x10	0.0 ~ 40.0	0.1	0	
40070	Remote profile: Number of cells	n/a	0 (disabled) 1- 30	1	0	
40071-40080	Remote profile: Profile name	20 characters stored as 2 ASCII bytes per register				
40081	Battery check period	Minutes	0 (disabled) 1- 1440	1	0	
40081	Boost time	Minutes	1- 1440	1	0	
40083	Charger MODBUS address	n/a	100 - 250	1	0	
40084	Current limit	A x10	0.00 ~ 12.00	0.1	0	
40085	Burn-in mode control	n/a				
40086 - 40095	Splash screen name	20 characters stored as 2 ASCII bytes per register				
40096	CAN output enable status	n/a	0x00 = Enabled			
40097	Boost drop-out current	A x10	0.0 – 12.0	0.1	0	
40098	Auto-boost period	Days	0 – 31	1	0	
40099	Input #1 programmable function	n/a	0x0000 = Manual boost reset 0x0001 = Boost inhibit >0x0001 = Not Used			
40100-40109	Charger firmware version	20 characters stored as 2 ASCII bytes per register				
40110-40119	Coms PCB firmware version	20 characters stored as 2 ASCII bytes per register				
40120 – 40129	Charger serial number	20 characters stored as 2 ASCII bytes per register, 10 registers, stored in EEPROM!				
Auto-detect configuration holding registers						
40150	Auto-detect profile 12V: Float voltage	V x10	0.0 ~ 40.0	0.1	0	
40151	Auto-detect profile 12V: Boost voltage	V x10	0.0 ~ 40.0	0.1	0	
40152	Auto-detect profile 12V: Boost initiate voltage	V x10	0.0 ~ 40.0	0.1	0	
40153	Auto-detect profile 12V: Boost time	Minutes	1- 1440	1	0	
40154	Auto-detect profile 12V: Low alarm voltage	V x10	0.0 ~ 40.0	0.1	0	
40155	Auto-detect profile 12V: High alarm voltage	V x10	0.0 ~ 40.0	0.1	0	
40156	Auto-detect profile 12V: Number of cells	n/a	1 - 30	1	0	
40157 - 40166	Auto-detect profile 12V: Profile name	20 characters stored as 2 ASCII bytes per register				
40167	Auto-detect profile 24V: Float voltage	V x10	0.0 ~ 40.0	0.1	0	
40168	Auto-detect profile 24V: Boost voltage	V x10	0.0 ~ 40.0	0.1	0	
40169	Auto-detect profile 24V: Boost initiate voltage	V x10	0.0 ~ 40.0	0.1	0	
40170	Auto-detect profile 24V: Boost time	Minutes	1- 1440	1	0	
40171	Auto-detect profile 24V: Low alarm voltage	V x10	0.0 ~ 40.0	0.1	0	
40172	Auto-detect profile 24V: High alarm voltage	V x10	0.0 ~ 40.0	0.1	0	
40173	Auto-detect profile 24V: Number of cells	n/a	1 - 30	1	0	
40174 – 40183	Auto-detect profile 24V: Profile name	20 characters stored as 2 ASCII bytes per register				
Extended holding registers						
40185	Battery check mode configuration	n/a	0x0000 = 10 second 0x0001 = Ultra-fast			
40186	Battery-missing action	n/a	0x0000 = Output off 0x0001 = Maintain float voltage			
40187	Constant current mode current limit	A x10				
40188	Public coms baud rate select	baud	0x0000 = 9600 0x0001 = 14400 0x0002 = 19200 0x0003 = 38400 0x0004 = 57600 Any other value = 9600 (default).			Note: Power must be cycled to activate new baud rate setting.
40189	Maximum boost period	Minutes	0xFFFF = 1440 mins (default of 24 hours) 0x0000 = Disabled			
40190	Parallel charger operation.	n/a	0x0000 = Enabled			

Table 1: Charger Status Register

Status Register Value	Charger State
0x0000	Power – up: (Detect connected battery matched DIP switch selection)
0x0001	Ramp PWM: (Increasing PWM value until current flow is detected)
0x0002	Float Charging
0x0003	Boost charging
0x0004	Boost decay: (Waiting for battery voltage to decay to float level after boost period.)
0x0005	Ramp PWM after boost: (Increasing PWM value until current flow is detected)
0x0006	PSU 12V: (Fixed 12V output, current limited to 10A)
0x0007	PSU 24V: (Fixed 24V output, current limited to 10A)
0x0008	Mains failure: (Waiting for mains to be available before commencing charge)
0x0009	Battery Error: (Checking if a valid battery voltage is detected which matches DIP switch settings)
0x000A	Boost extension: (Boost mode continues until boost timer reaches 0)
0x000B	Battery check: (Periodic check that a battery is still present)
0x000C	Battery missing: (Periodically checking for battery present)
0x000D	POST: (LEDs displaying selected profile from DIP switches)
0x000E	Calibration mode: (Special state for calibrating charger current measurement)
0x000F	Short circuit: (Output terminals short-circuit, waiting for short to be removed)
0x0010	Reducing Output voltage prior to battery check
0x0011	Battery connection error
0x0012	External Boost input active
0x0013	External nominal input active
0x0014	Power-up battery check
0x0015	Burn-in test mode
0x0016	Quick battery missing test
0x0017	Reserved
0x0018	Maximum boost period exceeded
0x0019	Parallel-mode fault

Table 2: DIP switch settings (1 to 4)

Note: When configured in genset mode

Switch Value	Profile Name	Float Voltage (V)	Boost Voltage (V)	Boost Initiate Voltage (V)	Boost extension period (Minutes)	Low Alarm Voltage (V)	High Alarm Voltage (V)
0	Automatic battery check *Values shown are factory default settings	13.5 or 27.0	14.1 or 28.2	12.5 or 25.0	360	12.0 or 24.0	16.0 or 32.0
1	12V Wet lead-acid	13.5	14.1	12.5	360	12.0	16.0
2	12V Calcium / Calcium	13.8	15.6	12.5	360	12.0	16.0
3	12V Lead-acid Antimony	13.5	14.7	12.5	360	12.0	16.0
4	12V VRLA AGM	13.5	14.4	12.5	360	12.0	16.0
5	12V VRLA GEL	13.5	13.8	12.5	360	12.0	16.0
6	12V NiCd 10-cell	14.4	14.5	12.5	360	12.0	16.0
7	12V Power supply	12.0					
8	24V NiCd 18-cell	25.6	26.1	25.0	360	24.0	32.0
9	24V NiCd 20-cell	28.2	29.0	25.0	360	24.0	32.0
10	24V Wet lead-acid	27.0	28.2	25.0	360	24.0	32.0
11	24V Calcium / Calcium	27.6	31.2	25.0	360	24.0	32.0
12	24V Lead-acid Antimony	27.0	29.4	25.0	360	24.0	32.0
13	24V VRLA AGM	27.0	28.8	25.0	360	24.0	32.0
14	24V VRLA GEL	27.0	27.6	25.0	360	24.0	32.0
15	24V Power supply	24.0					

Table 2a: DIP switch settings (5 & 6)

Mode	**Switch**	**Position/function** (ON = up, OFF = down)
Genset mode	S5	ON = Remote configuration enabled
	S6	No action
Fire pump mode	S5	ON = Remote configuration enabled
	S6	ON = MODBUS slave address = 105 OFF = MODBUS slave address = 100

Table 3: Fault Status Register

Bit	**Fault description**
0	1 = Mains failure
1	1 = Reversed battery connections detected
2	1 = Battery output short-circuit detected
3	1 = Battery missing (As detected in float mode)
4	1 = Incorrect battery type for DIP switches detected
5	1 = No battery detected
6	1 = High battery voltage alarm currently active
7	1 = Charge failure detected (Output current < 50mA)
8	1 = Low battery voltage alarm currently active
9	1 = Voltage sense level alarm
10	1 = Failed to charge: Boost level not achieved in time period
11	Not used
12	Not used
13	Not used
14	Not used
15	Not used

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