Gutor SDC

USER MANUAL — MODBUS Functionality of the Network Management Card (NMC)

Contents

Rev.	Description of change	Original document #: 7SA9046GB	Issued	Validated	Approved	Date
01	First edition / New design		mp	LOA	LUS	13-01-06
02	«Read Coil Registers Status Table» updated		mp	SKI	SKI	16-11-03

1. CONFIGURING MODBUS FUNCTIONALITY

MODBUS/RTU by 4-Wire RS485

The MODBUS / RTU can be either configured by the command line interface or by the web interface (HTTP).

For the MODBUS / RTU connector pinout see 7RG9032GB in section 6.2

Command Line Interface

To manually configure the modbus settings the Network Management Card needs to have a connection to the DC System. If the connection to the DC System is established, the 'modbus' command can be used in the command line interface to change the modbus settings.

Option	Arguments	Description
?		To display the command help.
-a	enable | disable	To enable or disable the modbus converter functionality.
-br	9600 | 19200	To change the MODBUS RS485 baud rate.
-pr	even | odd | none	To change the parity bit setting.
-s	1 – F7	To change the slave address in the range of 1 – 247 decimal (argument is allowed in hex only).
-ResetToDef		To reset the settings to the default values.

Example 1: To view the modbus settings of the Network Management Card, type:

`modbus` **and press** `ENTER`

Example 2: To manually change the baud rate to `19200` baud for the Network Management Card, type:

```
modbus -br 19200
```

Example 3: To manually change the slave address to `243` (0xF3), type the value in hex format:

```
modbus -s
```

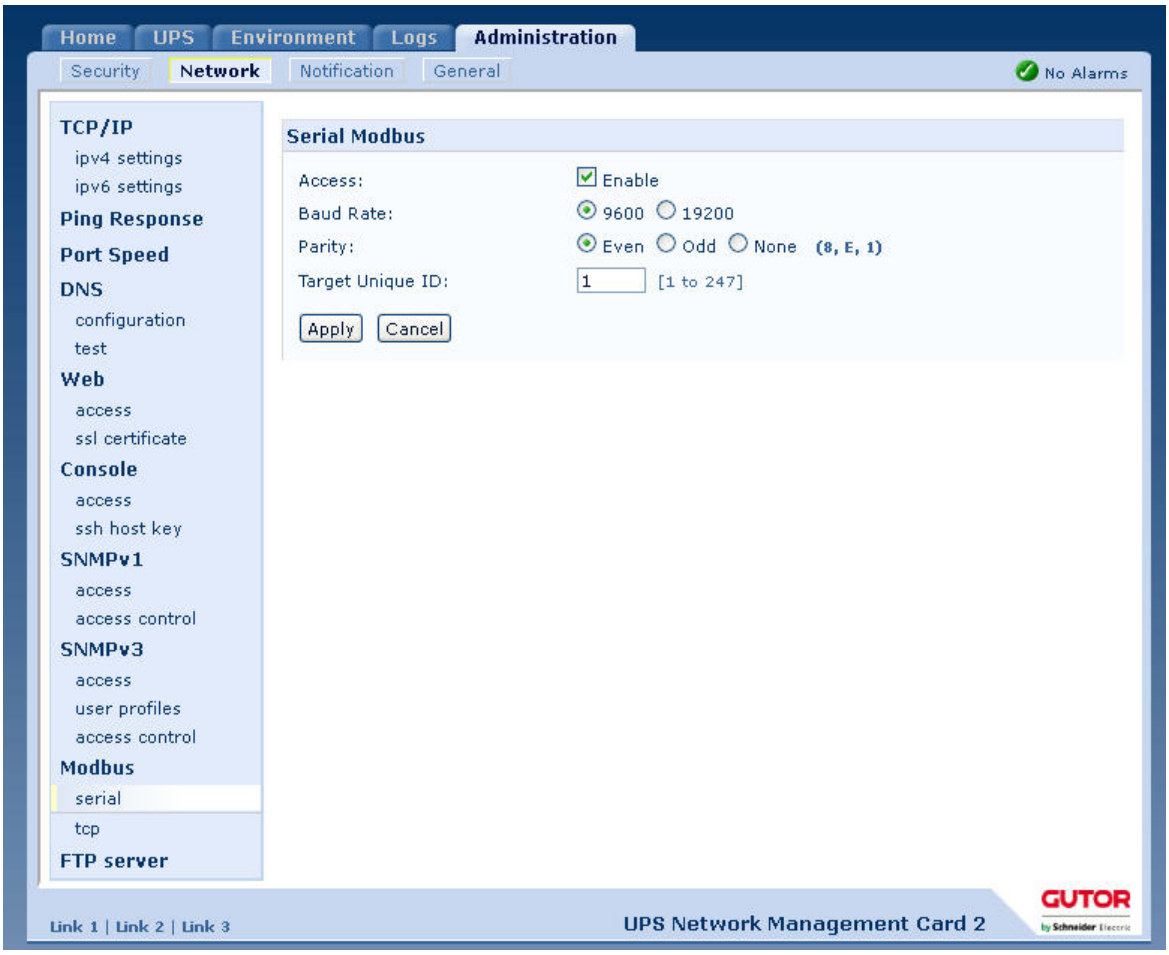
Web Interface (HTTP)

By opening the web browser and navigating to the Network Management Card's IP address, the MODBUS / RTU setting can be changed. When the TCP / IP settings are not yet configured, first see the documentation 7RG9032GB in section 4, where it is described how to configure the IP address of the Network Management Card.

- Log in on the page.
- Use **gutor** for the user name and password.
- The MODBUS serial settings can be changed by clicking on:

  Administration > Network > Modbus > serial

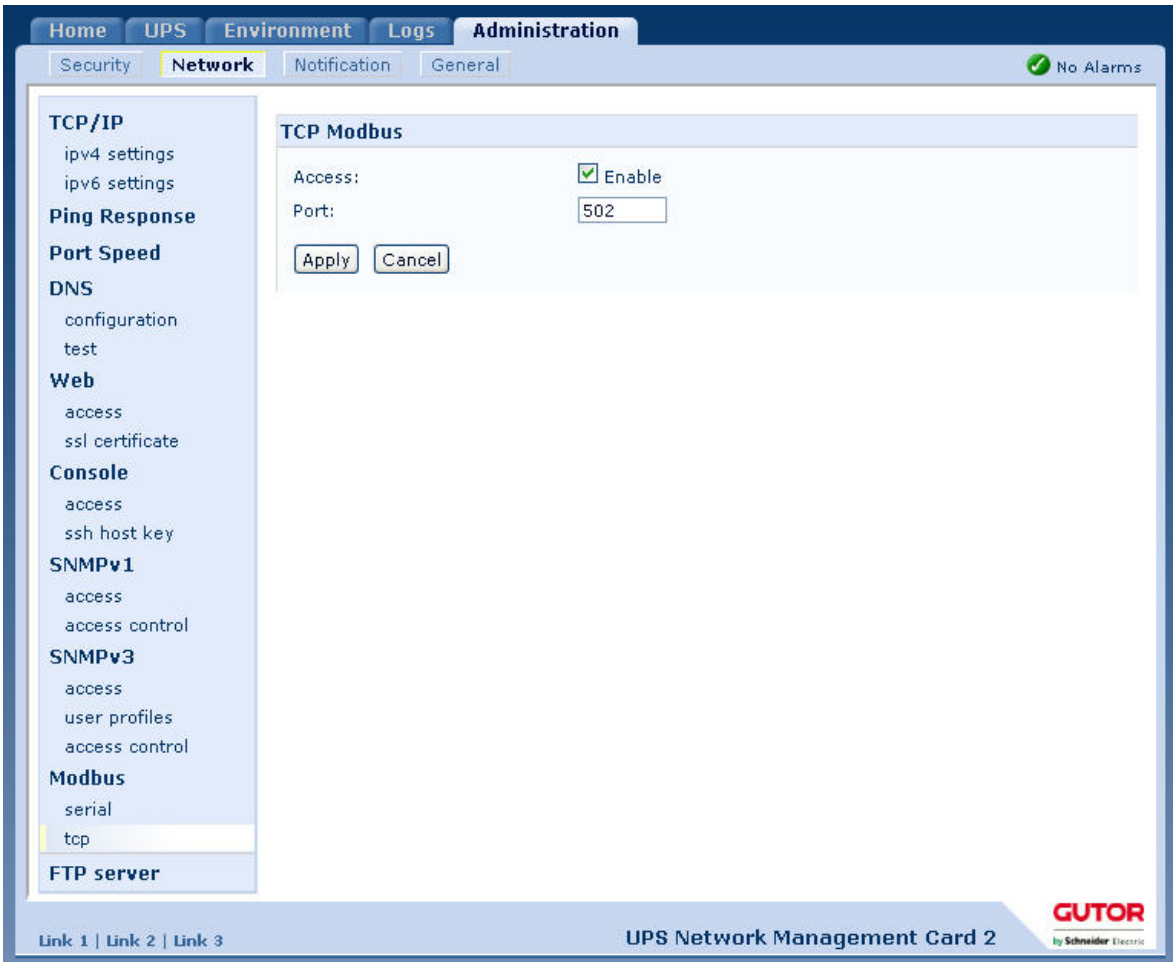
- There the settings can be changed as shown in the following picture.



MODBUS/TCP

By opening the web browser and navigating to the Network Management Card's IP address, the MODBUS / TCP setting can be changed. When the TCP / IP settings are not yet configured, first see the documentation 7RG9032GB in section 4, where it is described how to configure the IP address of the Network Management Card.

- Log in on the page.
- Use **gutor** for the user name and password.
- The MODBUS tcp settings can be changed by clicking on:
  Administration > Network > Modbus > tcp
- There the settings can be changed as shown in the following picture.



2. MODBUS ADDRESSING INFORMATION

This section outlines the addressing structure used to expose the DC System information to the MODBUS protocol. The following tables are showing, which information can be reached at which address.

2.1 Function Call 01: Read Coil Registers Status Table

The data type for all Read Coil Registers is boolean. The details about the registers are shown in the table below.

Coil Register	Format	Parameter	Notes
00001	B	High DC Warning	DC is over high DC warning level.
00002	B	Battery operation	Charger is running on battery.
00004	B	Low DC Vaux Warning	The DC voltage after serial diode is below DC warning level.
00005	B	DC voltage high	DC is over high DC warning / shutdown level.
00006	B	Common fault	Common alarm bit for all alarms in Charger except from Battery current limit and Blocking of boost / initial. If cleared consider as "Charger OK" condition.
00017	B	Battery not connected	Battery breaker is open.
00018	B	Battery temperature fault	Battery temperature out of range or sensor fault.
00021	B	DC voltage low warning	DC voltage is below low DC warning level.
00027	B	Digital input 1	If digital input 1 is open, coil register has value 1.
00028	B	Digital input 2	If digital input 2 is open, coil register has value 1.

Coil Register	Format	Parameter	Notes
00035	B	Rectifier mains failure	Phase order not correct, or mains voltage is out of tolerance window, or mains is out of frequency window, or at least one phase is missing. Charger will shut down.
00036	B	Load MCB Off	Load breaker is open.
00037	B	Mains MCB Off	Mains breaker is open.
00040	B	DC fuse blown	The rectifier DC fuse has blown.
00041	B	Rectifier overcurrent	Current limiter for total DC current is active.
00042	B	Parallel error	Load sharing differs more than ± 10%.
00043	B	Battery defective	Conclusion of battery monitor test.
00044	B	Battery disconnected	Battery breaker is open.
00045	B	Earth fault	Earth current is running to positive pole or earth current is running to ground pole.
00047	B	Control power fault	The DC circuit of the redundant PSU is defective or the AC circuit of the redundant PSU is defective.
00048	B	Overtemperature	Temp. is over 90° C or temperature signal switch in transformer off or temperature signal switch in choke off or temperature signal switch in diode off.
00049	B	Fan fault	Fan 1,2,3,4,5,6,7 or 8 is rotating to slowly.(fan pulse signal < 20 Hz)
00051	B	Option 1 error	Status of Option 1 error.
00052	B	Option 2 error	Status of Option 2 error.
00053	B	Option 3 error	Status of Option 3 error.
00054	B	Option 4 error	Status of Option 4 error.
00055	B	Option 5 error	Status of Option 5 error.
00056	B	Option 6 error	Status of Option 6 error.
00057	B	Option 7 error	Status of Option 7 error.
00058	B	Option 8 error	Status of Option 8 error.
00059	B	Battery symmetry fault	Half of the battery voltage is outside of the tolerance window.
00060	B	Battery weak	Conclusion of battery monitor test.

GENERAL EXPLANATION:

The delay between the polls should be more than 10 seconds because the update rate of most of the registers is about 10 seconds. All coil registers in the range of 00001 – 00071 which are not mentioned in the table above are reserved.

Coil Register: Number of the Read Coil Register on function call 01. Note that a value of 1 in the Read Coil Registers means that the individual status or alarm mentioned in the column Parameter is active.

Format: Data type format B means Boolean.

Parameter: Boolean name / source.

Notes: Some additional information about the individual parameter.

2.2 Function Call 03: Read Holding Registers Table

The data type for all Read Holding Registers is 16-Bit unsigned integer. The details about the registers are shown in the table below.

Holding Register	Format	Parameter	Unit of measure	Factor	Notes
40004	FFFF	Mains voltage L1	V	1	Phase L1 to Phase L2.
40005	FFFF	Mains voltage L2	V	1	Phase L2 to Phase L3.
40006	FFFF	Mains voltage L3	V	1	Phase L3 to Phase L1.
40010	FFFF	Mains current L1	A	1	
40011	FFFF	Mains current L2	A	1	

Holding Register	Format	Parameter	Unit of measure	Factor	Notes
40012	FFFF	Mains current L3	A	1	
40019	FFFF	Total DC current	A	1	
40020	FFFF	Battery current	A	1	
40022	FFFF	Operation mode	N/A	1	Value reflects the actual operation mode of the system acc. the following scheme: 1 = Initializing after reset. 2 = Standby. 3 = Battery operation. 4 = Float charge. 5 = Boost charge. 6 = Initial charge.
40029	FFFF	DC voltage	V	1	
40031	FFFF	Active systems	N/A	1	1 = single / 2 = parallel.
40033	FFFF	DC Vaux. voltage	V	1	
40035	FFFF	Battery temperature	°C or °F	1	Temperature sensor is an option; shows Fahrenheit or Celsius value depending on UPS firmware setting. If not mounted this field will show a value of around 226!
40040	FFFF	System load	%	1	Percent of Charger power capacity presently used.
40041	FFFF	Battery time left	min	1	
40045	FFFF	Firmware version, first digit	N/A	1	
40046	FFFF	Firmware version, second digit	N/A	1	
40047	FFFF	Firmware version, third digit	N/A	1	

GENERAL EXPLANATION:

The delay between the polls should be more than 10 seconds because the update rate of most of the registers is about 10 seconds. Not all registers are used for all system configurations.
All read holding registers in the range of 40001 – 40047 which are not mentioned in the table above are reserved.

Holding Register: Number of the Read Holding Register on function call 03.

Format: Data type format is unsigned integer. FFFF means hexadecimal data format value of 4 digits. This corresponds to an absolute range of decimal 0 – 65535.

Parameter: Measurement name/source.

Unit of measure: The unit of measure in which the respective analog value is measured.

Factor: The factor with which the value is multiplied to transfer it. E.g. if a value has a factor of 10 then the real value is 10 times smaller, the last numeric character shows the 10^{th} of the value.

Notes: Some additional information about the individual parameter.