Motortronics VirtualSCADA® VS2-MT

Communication Gateway

VS2-MT

User Manual

Revision 1.03.00

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Warranty and support

To obtain fast and simple support for your **VirtualSCADA VS2-MT** product visit our website or contacts us.

Product return

If you experience any problems with a **VirtualSCADA VS2-MT** device and wish to have it repaired or exchanged, please follow these steps:

- Obtain a RMA Return Number
- To get this number you'll need to provide some information about the problem you have, contact information etc.
- Print the "RMA Number" and send it to us together with the product. Make sure the RMA is visible on the outside of the package, and that the delivery is pre-paid, otherwise the delivery won't be accepted by us. Also provide evidence of original purchase.
- If the faulty product is covered by the 12-month warranty, we will repair or exchange the device and return it within 30 days. If the product is not covered by Warranty we will advise an estimated repair cost.

Our standard terms and conditions apply for this product.

Terminology

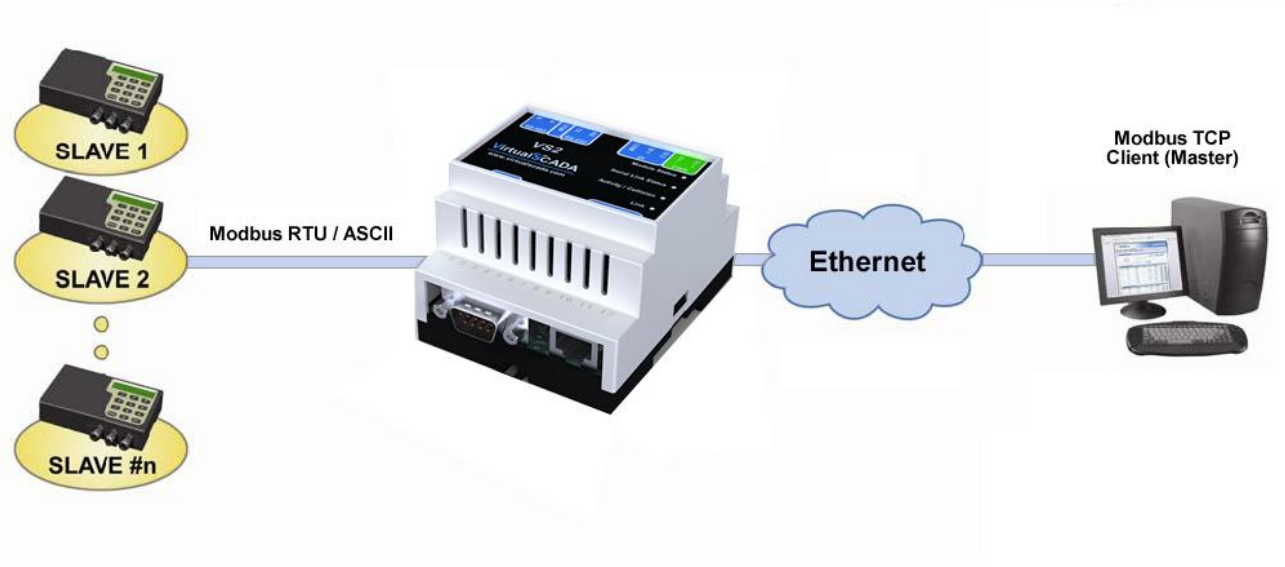
Term	Extract	Description
TCP/IP	Transmission Control Protocol/ Internet Protocol	TCP (Transmission Control Protocol) is a set of rules used along with the Internet Protocol (IP) to send data in the form of message units between computers over the Internet.
HTTP	Hyper Text Transfer Protocol	HTTP is a set of rules for exchanging files (text, graphic images, sound, video, and other multimedia files) on the Web.
DHCP	Dynamic Host Configuration Protocol	DHCP is a standard protocol that automates the process of configuring network hosts by allowing hosts to obtain IP addresses and configuration parameters
Gateway		A device that makes it possible to transfer data between networks of different kind, e.g. Modbus/RTU and Modbus/TCP.
Template		Describes a Modbus slave device, as a collection of groups and parameters.
Device		A Modbus slave unit that is connected to the VirtualSCADA.

This symbol indicates important information or useful instructions on how to use the product.

1 About the VirtualSCADA VS2-MT Gateway

1.1 General

The VirtualSCADA VS2-MT Gateway can be used to connect a Modbus/TCP master to one or more Modbus/RTU slaves. The transparent ModbusTCP/RTU gateway will act as a Modbus/TCP slave on an Ethernet network, transform the queries to the Serial Modbus network, and send back the Modbus/RTU slave response to the Modbus/TCP master. The gateway can handle up to 5 connections of one or more Modbus TCP masters simultaneously.



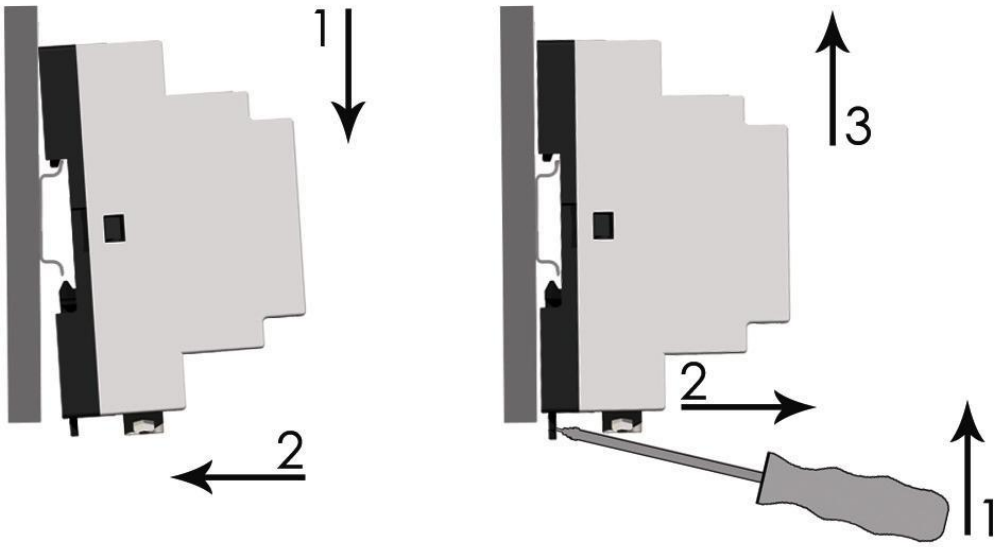
The VirtualSCADA VS2-MT Gateway supports RS232 through a 9-pole D-SUB connector or RS485 via a screw terminal connector.

The VS2-MT Gateway supports 10/100Mbps Ethernet through a standard Ethernet connector (RJ-45) and can be configured via a web-interface or by using the VirtualSCADA VS2-MT Configuration utility.

IMPORTANT: Make sure VS2-MT is used on a secure network.

1.2 Mounting

A – Snap on **B – Snap off**



1 – Snap the **VirtualSCADA VS2-MT** on to the DIN-rail (as shown in picture A above).

2 – Connect the Ethernet cable to the RJ45 connector.

3 – Connect the ModbusRTU network to the D-SUB connector (RS232) or the screw terminal connector (RS485 / RS232).

4 – Connect the Power Supply and apply power.

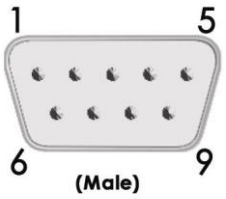
5 – Now you can start using the Gateway. Use the "**VirtualSCADA VS2-MT** Configuration utility" to configure the IP address and other network settings. See section 2.1 for further information.

The default IP address of the VirtualSCADA VS2-MT is 10.200.1.1 Please change this IP-address to a valid address on your network. Also, make sure not to power up more than one network attached VirtualSCADA VS2-MT before the IP-address is changed or DHCP is enabled.

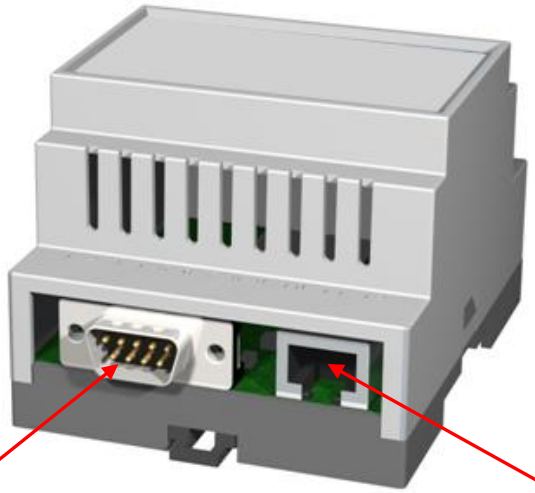
1.3 Connectors

1.3.1 Modbus RTU interface, RS232

The 9-pole D-SUB, male connector on the **VirtualSCADA VS2-MT** unit contains a RS232 interface. This port can be used to connect to any equipment with an RS232 interface.



Pin number	Function
1	CD (Carrier Detect)
2	Rx (Receive)
3	Tx (Transmit)
4	DTR (Data Terminal Ready)
5	GND
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	RI (Ring Indicator)

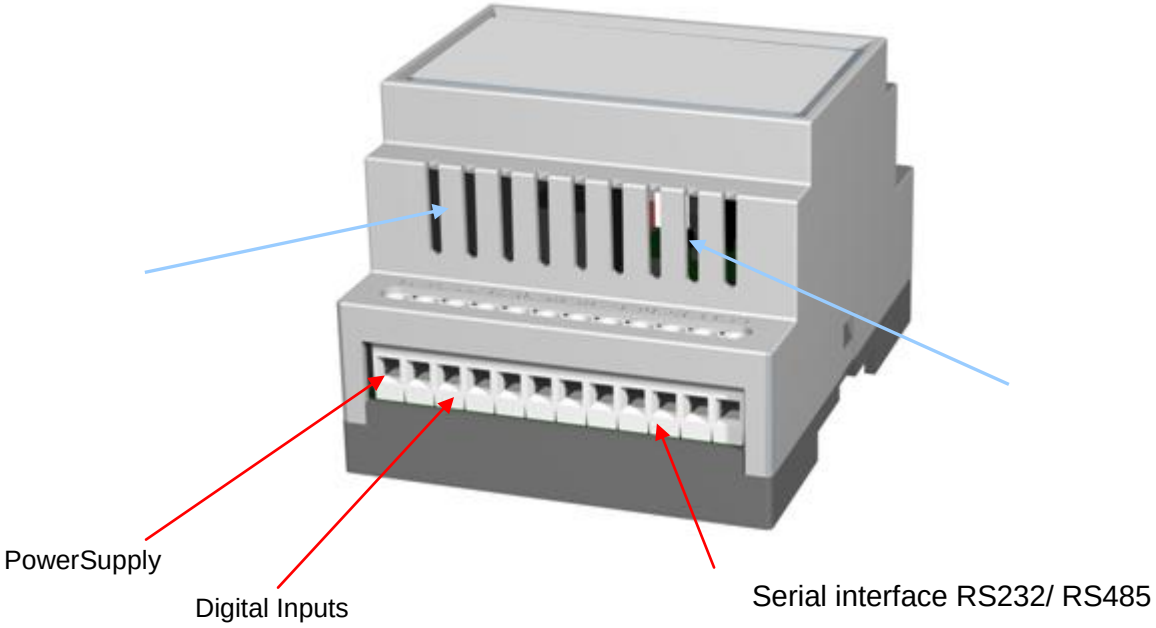


Serial interface
(SUB-D 9 Pin, RS232)

Ethernet interface
(RJ-45, 10/100Mbps)

1.3.2 Modbus RTU interface, RS232/485

The 12-pole screw connector contains a RS232 and a RS485 interface. This port can be used to connect to any equipment using one of these interfaces. See table on next page for details.



1.3.3 Ethernet interface

The Ethernet interface supports 10/100Mbps, using a standard RJ-45 connector.

1.3.4 Power supply connection

The VirtualSCADA VS2-MT gateway can be powered by a 9-28 VAC/DC supply (70mA / 1.7W).

1.3.5 Digital inputs

The digital inputs are opto-isolated, with the following input specifications:

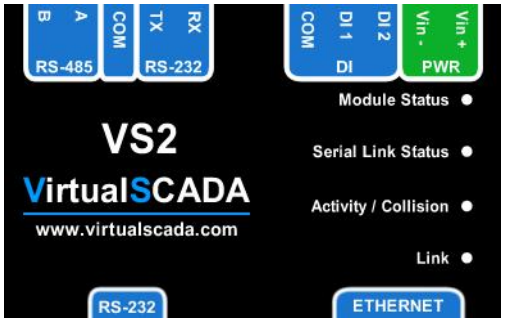
Logic HIGH input: 10 – 24 VDC
Logic LOW input: 0 - 2VDC

The status of the inputs can be read in the Gateway Internal Registers (if enabled). See section 2.2.4 for more information.

1.3.6 RS232/RS485 interface, Digital Inputs, Power Supply

Pin number	Function
24	Vin+ (Power supply)
23	Vin- (Power supply)
22	Digital In 2+ (10-24VDC)
21	Digital In 1+ (10-24VDC)
20	Digital Input common
19	Not Connected
18	Not Connected
17	RS232 Receive
16	RS232 Transmit
15	Common
14	RS485 Line A
13	RS485 Line B

1.4 Indicators



LED Functionality

Name	Color	Function
Module Status	OFF	No power
	Green	Module is running in normal mode
	Orange	During boot-up
Serial Link Status	Flashing Green	Serial Packet received
	Flashing Red	Serial Packet transmit
	Orange	During boot-up
Ethernet Activity/Collision	Flashing Green	Ethernet Packet received
	Flashing Red	Ethernet Collision detected
Link	OFF	No Ethernet Link detected
	Green	Ethernet network detected, 10Mbps
	Orange	Ethernet network detected, 100Mbps

2 Getting started

2.1 Configure the VirtualSCADA VS2-MT IP-address

2.1.1 About the VirtualSCADA VS2-MT Configuration utility

The **VirtualSCADA** Configuration utility is PC-based and configures the TCP/IP network settings in the VirtualSCADA VS2-MT. This utility has the ability to scan the Ethernet network for connected **VirtualSCADA VS2-MT** devices and let the user set IP-address, net mask, gateway, DNS and hostname for each unit.

2.1.2 Installation

System Requirements

- Windows 2000/XP/VISTA
- Pentium 133 MHz or higher
- 5 Mb of free space on the hard drive
- Network Interface Card (Ethernet)

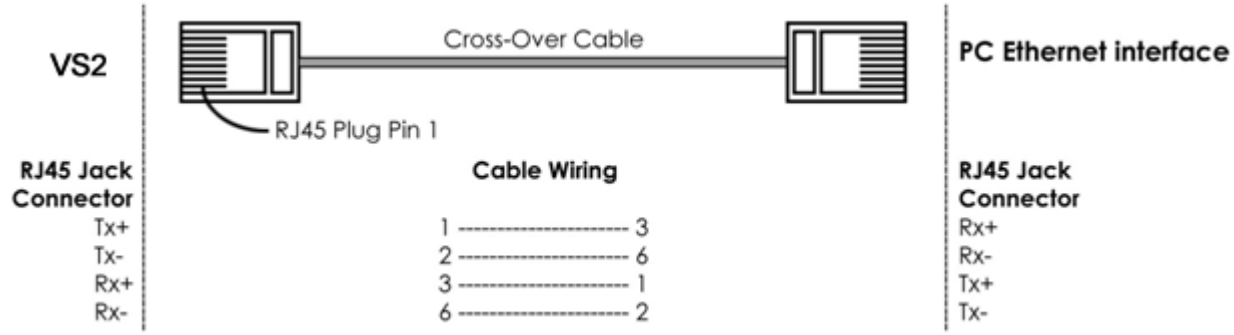
Installation Procedure

- Using the CD-ROM: Run “Setup.exe” and follow the instructions.
- From website: www.motortronics.com

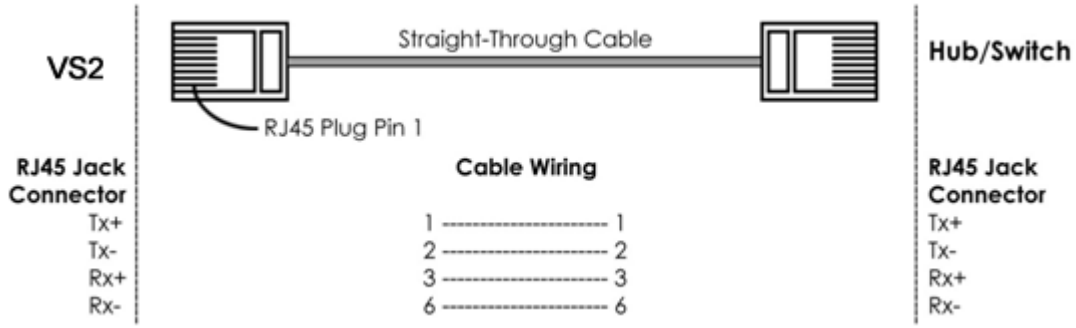
2.1.3 Scanning for connected devices

First ensure that you have connected the **VirtualSCADA VS2-MT** units that you want to install on the same Ethernet network as the PC is connected to. Use standard Ethernet cables, straight-through or crossover cable, depending on how you connect to the device. See the following diagrams below for details.

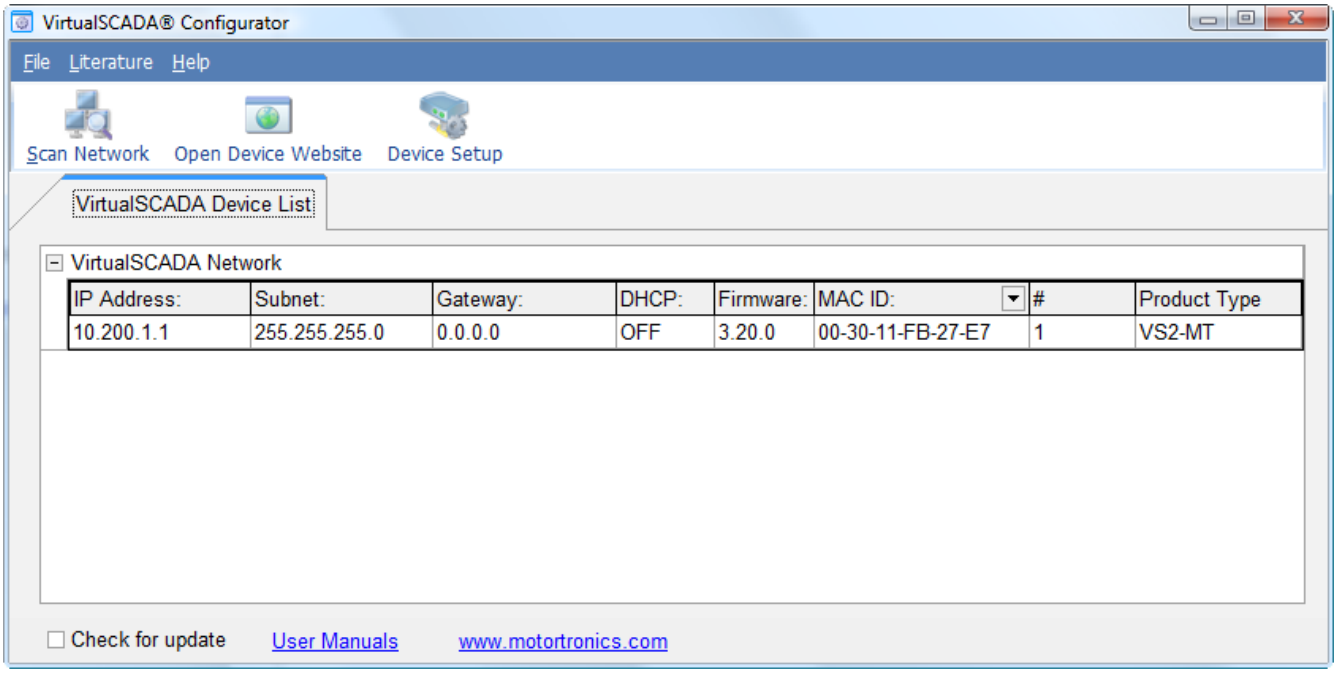
Connecting the VirtualSCADA VS2-MT to a hub or Switch



Connecting the VirtualSCADA VS2-MT directly to a PC



When the **VirtualSCADA** Configuration utility is started, it will scan the Ethernet network for **VirtualSCADA VS2-MT** devices. All detected devices will be presented in a list in the main window. If you want to force a new scan for devices, you can press the "**Scan**" button.



IP: The IP address of the VirtualSCADA VS2-MT

Subnet: The subnet mask

Gateway: The default gateway

DHCP: Dynamically assigned IP address On/Off

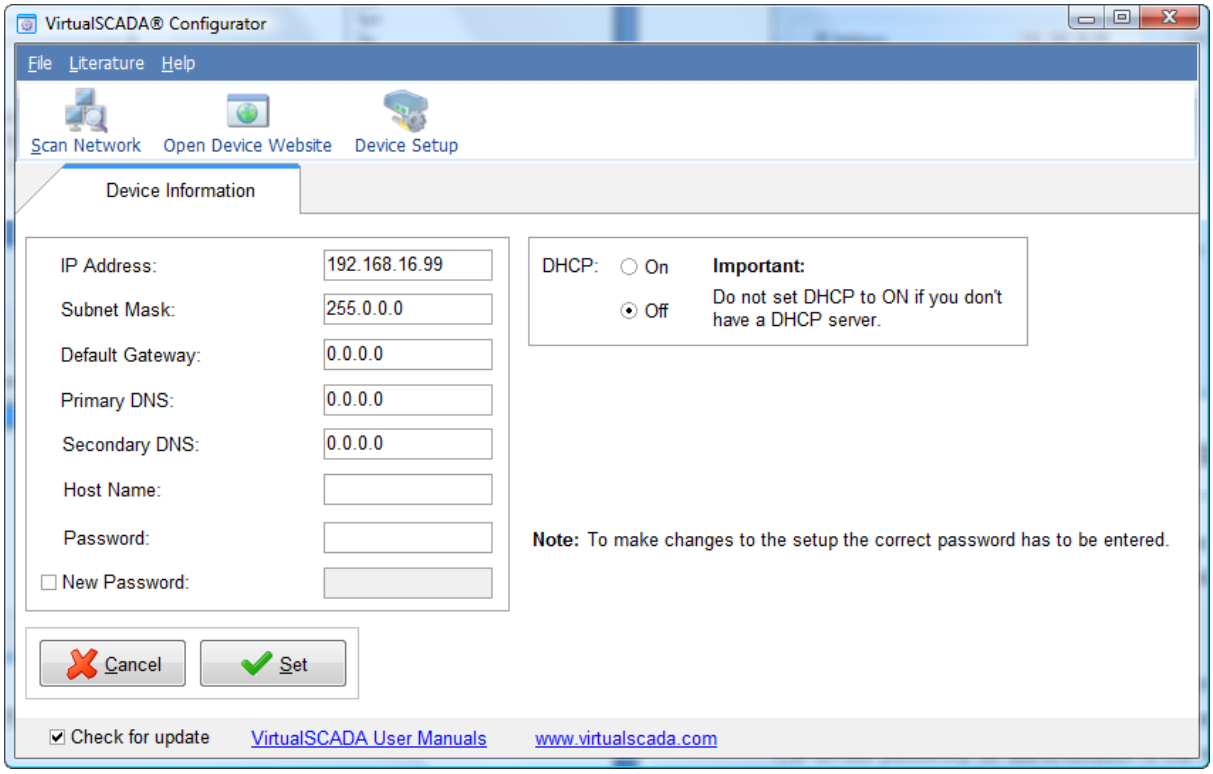
Version: Firmware version

MAC: The Ethernet MAC address

2.1.4 Changing IP settings

To change the IP settings on a detected device, double-click on the device you want to configure in the list of devices. This will open up a dialog screen where you can enter the desired IP configuration.

To obtain the necessary information about IP address, subnet mask etc. please contact your network administrator.



DO NOT SET DHCP TO "ON" IF YOU DON'T HAVE A DHCP-SERVER AVAILABLE ON THE NETWORK.

Host Name - Here you can enter the hostname of your device (**optional**).

IP Address - The IP address of the VirtualSCADA VS2-MT.

Subnet Mask - The subnet mask

Default Gateway - The default gateway

Primary DNS - The primary Domain Name Server (**optional**)

Secondary DNS - The secondary Domain Name Server (**optional**)

The default password for authentication of the new settings is "**admin**".

Pressing "**Set**" will cause the **VirtualSCADA VS2-MT** device to reboot and after that the new settings will be enabled.

You can test the new settings by opening a web-browser and enter the IP you assigned to the device. If you selected DHCP and want to know what IP your device has been assigned, you can do a new scan with the **VirtualSCADA VS2-MT** Configuration utility to view the new network configuration.

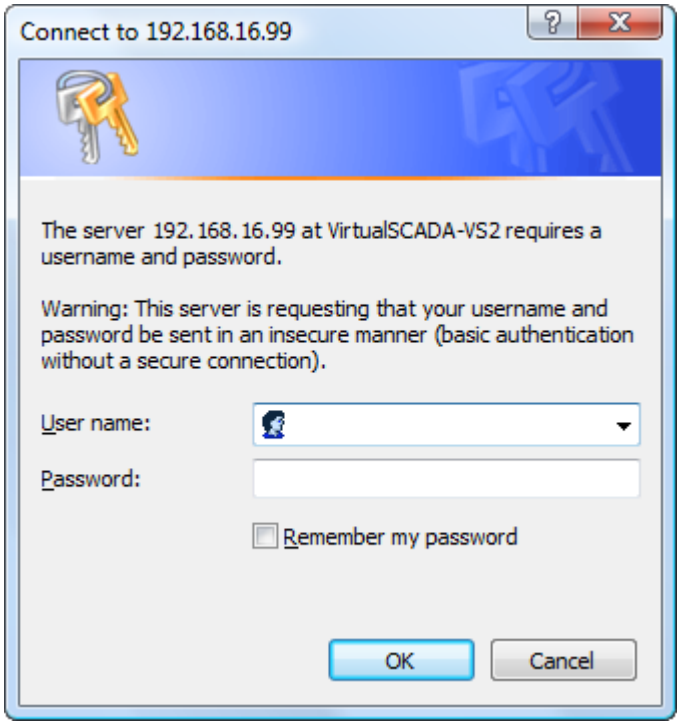
3 Configure the Gateway

3.1.1 Log in

Open a web browser (Internet Explorer for example) and enter the IP address you have set on the VirtualSCADA VS2-MT Gateway with the VirtualSCADA Configuration utility. For example, if you entered the address 192.168.16.99 then you should enter the text below in the address field of the browser and press enter.

http://192.168.16.99

Now you should see the login screen:



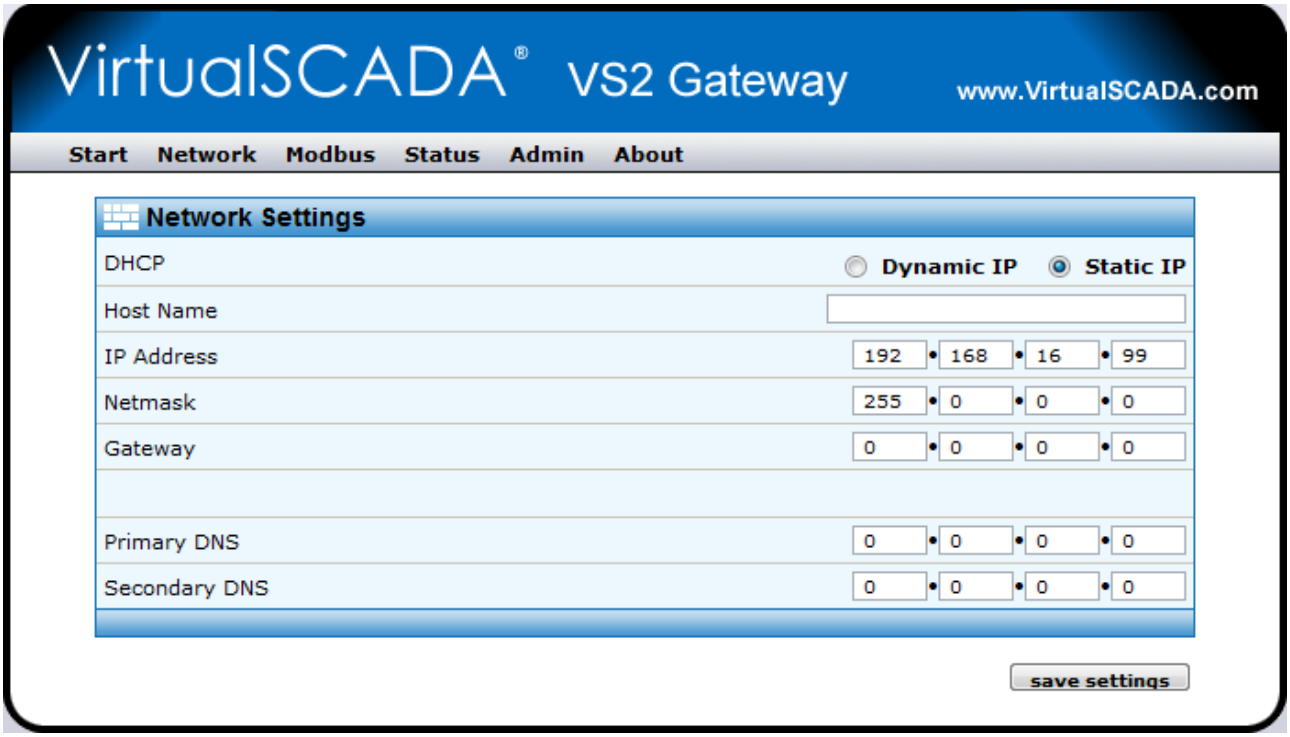
To be able to configure the Gateway enter “admin” in the user-name box and password box. You can later change the default password as described in the section “Admin” below.

If you have problems logging in make sure that Caps Lock is not turned on.

The welcome screen of the VirtualSCADA VS2-MT gateway.

3.1.2 Network settings

If you press the Network link you will be presented with the following screen:



On this page you can view or change the TCP/IP network settings in the module. These settings are the same as the ones set by the VirtualSCADA Configuration utility.

DHCP: Select this if you have a DHCP server on your network and you want the IP address be assigned automatically.

NOTE! Do not select the DHCP option if you don't have a DHCP server available on the network.

Host Name: Here you can enter a hostname of your device (**optional**).

IP Address: The IP address.

Netmask: The subnet mask

Gateway: The default gateway

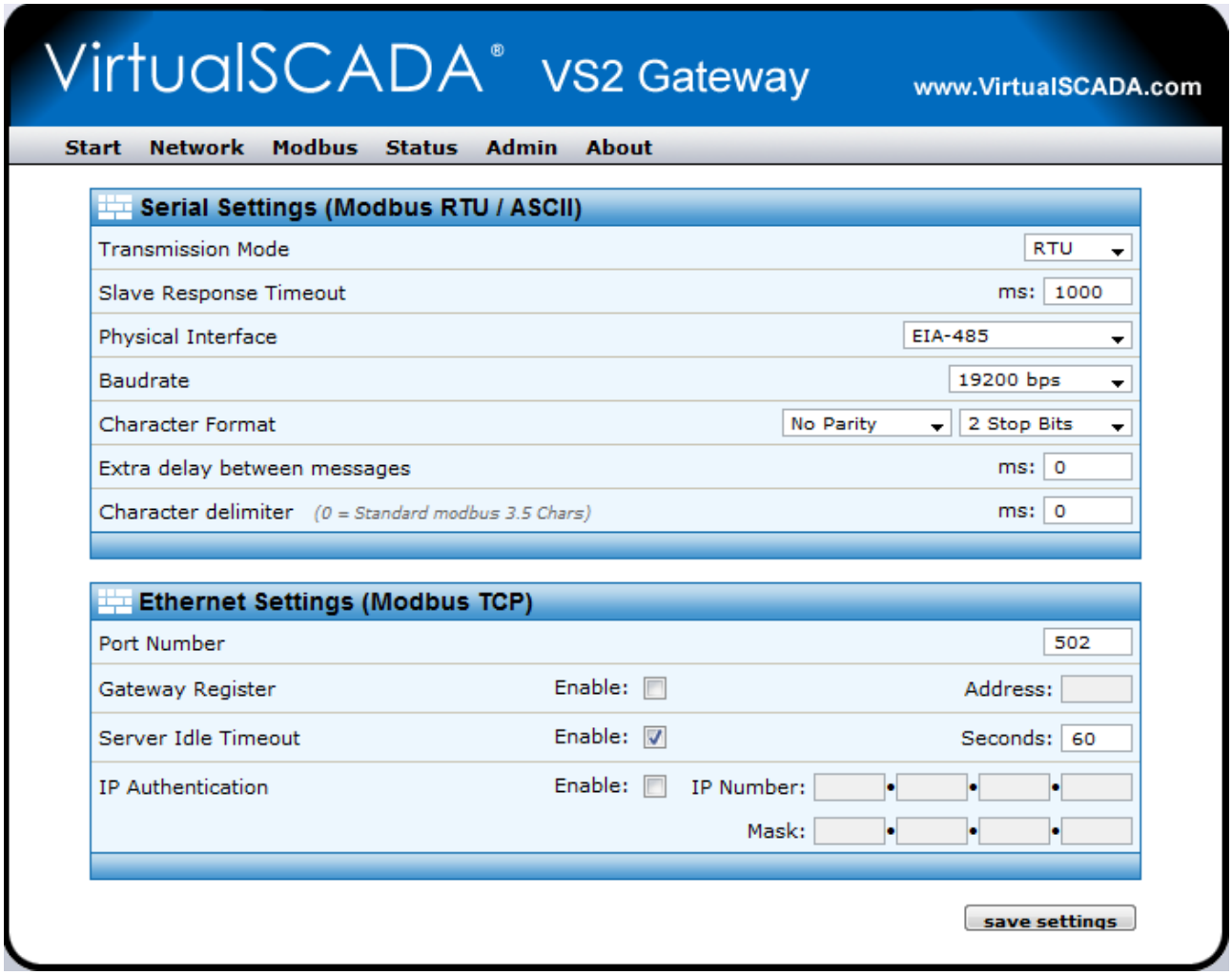
Primary DNS: The primary Domain Name Server (**optional**)

Secondary DNS: The primary Secondary Name Server (**optional**)

Press "Save Settings" to save your changes.

3.1.3 Modbus Configuration

If you press the Modbus link you will be presented with the following screen:



Serial Settings (Modbus RTU)

Slave Response Timeout: (Default 200 ms)

Physical Interface: EIA-485 or EIA-232

Baudrate: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200 bps.

Character Format: Select number of stop bits and parity (Odd, Even) if applicable.

Ethernet Settings (Modbus TCP)

Port number: The port number for Modbus TCP communication (502 default).

Gateway Registers: The address offset to the gateway internal registers (if enabled). See Section 2.2.4 for details about the internal registers.

Server Idle Timeout: This parameter gives the idle timeout in seconds for the Modbus/TCP connection.

If the Gateway doesn't receive any Modbus/TCP query within this time the connection will be closed. (Default value is 60 seconds).

IP Authentication: This can be used to configure the IP-number that is allowed to connect to the Gateway.

Press "Save Settings" to save your changes.

NOTE! It is of great importance to ensure no serial two devices on the network are set to the same address. If this is the case, an abnormal behavior of the serial network bus can occur; The Master will not be able to communicate with any of the devices on the bus.

3.1.4 Internal Registers

If VirtualSCADA VS2-MT Gateway registers are enabled, queries sent to that address are not forwarded to the Serial Modbus/RTU network; the Gateway will respond by it self.

The table below describe the internal registers:

Holding register	Name	Values	Options	Comment
1	Digital input 1 status	0 or 1		Read only
2	Digital input 2 status	0 or 1		Read only
	Serial Status registers			See section (2.2.6)
3	Valid responses	0-65535		Can be cleared
4	Serial timeouts	0-65535		Can be cleared
5	CRC errors	0-65535		Can be cleared
6	Input Buffer overruns	0-65535		Can be cleared
7	Exception responses	0-65535		Can be cleared
	Configuration Registers			
8	Modbus/TCP Port	1-65535		Default port number is 502
9	Gateway Modbus address	(-1)-255		
		-1	Disabled	Default
		0 - 255	Enabled	
10	Modbus/TCP idle timeout	0-65535 (seconds)		Default 60 seconds
		0	Disabled	
		1 - 65525	Enabled	
11	Baudrate	0-9		
		0	300 bps.	
		1	600 bps.	
		2	1200 bps.	
		3	2400 bps.	
		4	4800 bps.	
		5	9600 bps.	
		6	19200 bps.	Default value
		7	38400 bps.	
		8	57600 bps.	
		9	115200 bps.	
12	Parity	0-2		
		0	No parity	Default
		1	Even parity	
		2	Odd parity	
13	Number of Stop bits	1-2		Default 1 stop bit

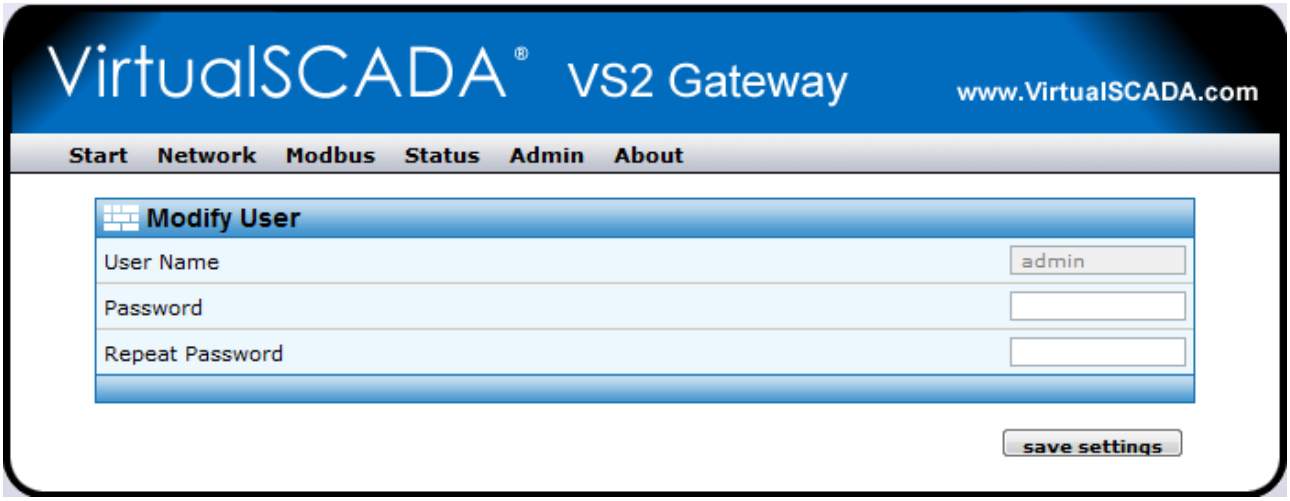
Holding register	Name	Values	Options	Comment
14	Slave timeout time	25-65535 (milliseconds)		Default 200 ms.
15	Physical interface	0-1		
		0	EIA-485	Default
		1	EIA-232	
	Authentication			
16	Valid IP address 1	0-255		First byte of IP address
		0	Disabled	IP address auth disabled
		1-255	Enabled	
17	Valid IP address 2	0-255	Enabled	Second byte of IP address
18	Valid IP address 3	0-255	Enabled	Third byte of IP address
19	Valid IP address 4	0-255	Enabled	Fourth byte of IP address

Valid commands:

Command	Name
3	Read Holding Registers
6	Preset Single Register
16	Preset Multiple Registers

3.1.5 Password settings

If you press the Admin link you will be presented with the following screen:

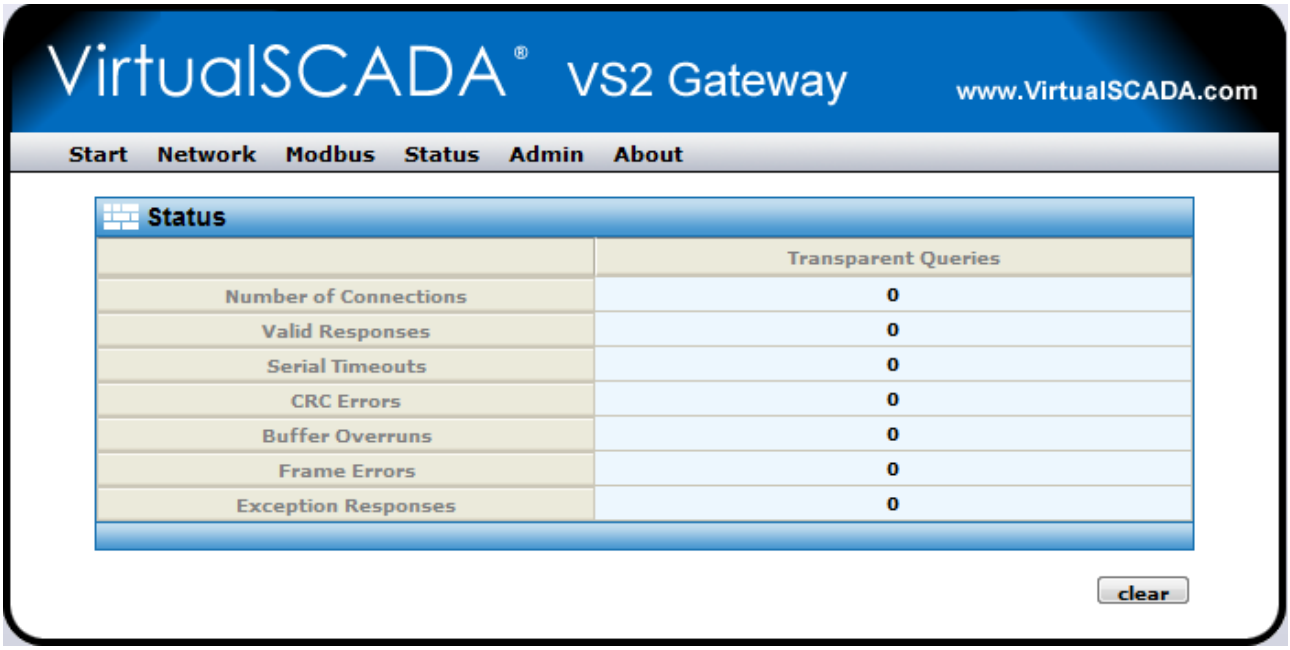


This screen allows you to change the administrator password for the VirtualSCADA VS2-MT Gateway. Enter the new password in the Password box and in the Repeat Password box.

Click “Save Password” to change the password.

3.1.6 Status

This screen shows some Status information:



Number of Connections: Indicates the number of open connections to the Modbus TCP master.

Valid Responses: Counts valid responses from the Modbus/RTU devices on the network.

Serial Timeouts: The number of time-outs from attached slaves.

CRC Errors: The number of CRC errors on incoming Modbus/RTU responses.

Buffer Overruns: If an incoming Modbus/RTU response is larger than 300 bytes, it will cause the input buffer to overflow.

Frame Errors: Counts the number of frame errors, which can be parity errors, wrong number of stop bits or incorrect baud rate.

Exception Responses: Counts all exception responses from the connected Modbus/RTU slaves.

3.1.7 About

This screen shows some information which can be helpful when contacting VirtualSCADA Support.

Product Name: Shows the product name of the VirtualSCADA® Product.

Revision: Shows the software version of the VS2-MT Gateway.

Mac-address: Shows the mac-address of the Ethernet Interface of your VirtualSCADA® VS2-MT Gateway.

APPENDIX A: SPECIFICATIONS

Ethernet connection

10Base-T or 100Base-TX (IEEE 802.3). RJ45 connector.

Serial interfaces

EIA-232 with full modem control (RTS,CTS,DCD,DTR,DSR,RI)
300-115.200bps. 9-pole SUB-D connector

EIA-485, 300-115.200bps. screw connector

Power Supply

9-32 VAC/DC (1.7W)

Temperature range

Operating : -40 - 85 °C
Storage : -40 - 85 °C

Humidity range

5-93% RH, non-condensing

Cover material

Grey plastic, LEXAN 940, self-extinguishing acc. to UL94-V0

Mounting option

Plastic housing: DIN rail (EN 50022)
Metal housing: Screw mounting (DIN rail optional)

CE certification

According to EN 50 081-2:1993 and EN 61000-6-2:1999

Motortronics.com