



Protocol converter for serial data (ASCII/RAW) to Ethernet

User manual

User manual

Protocol converter for serial data (ASCII/RAW) to Ethernet

2016-12-13

Revision: A

This user manual is valid for:

Designation	Order No.
GW DEVICE SERVER 1E/1DB9	2702758
GW DEVICE SERVER 1E/2DB9	2702760
GW DEVICE SERVER 2E/2DB9	2702761
GW DEVICE SERVER 2E/4DB9	2702763

Please observe the following notes

User group of this manual

The use of products described in this manual is oriented exclusively to qualified application programmers and software engineers, who are familiar with the safety concepts of automation technology and applicable standards.

Explanation of symbols used and signal words



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety measures that follow this symbol to avoid possible injury or death.

There are three different categories of personal injury that are indicated with a signal word.

DANGER This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



This symbol together with the signal word **NOTE** and the accompanying text alert the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.



This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.

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1 Description

The GW DEVICE SERVER... devices migrate legacy serial devices to modern Ethernet networks. The family consists of universal RS-232/422/485 one-, two-, and four-port serial versions, with one or two Ethernet ports to fit any application.

With the aid of virtual COM ports, existing application software that supports only serial communication can be redirected to the network card of a PC with a Windows® operating system using the Windows COM port driver or the COM Port Redirector software, available free of charge.

This user manual is valid for:

Table 1-1 GW DEVICE SERVER...types

Type Description	Order No.
GW DEVICE SERVER 1E/1DB9	2702758
GW DEVICE SERVER 1E/2DB9	2702760
GW DEVICE SERVER 2E/2DB9	2702761
GW DEVICE SERVER 2E/4DB9	2702763

1.1 Structure

GW DEVICE SERVER 1E/1DB9

The GW DEVICE SERVER 1E/1DB9 features one Ethernet port and one RS-232/422/485 serial port with a D-SUB 9 connector.

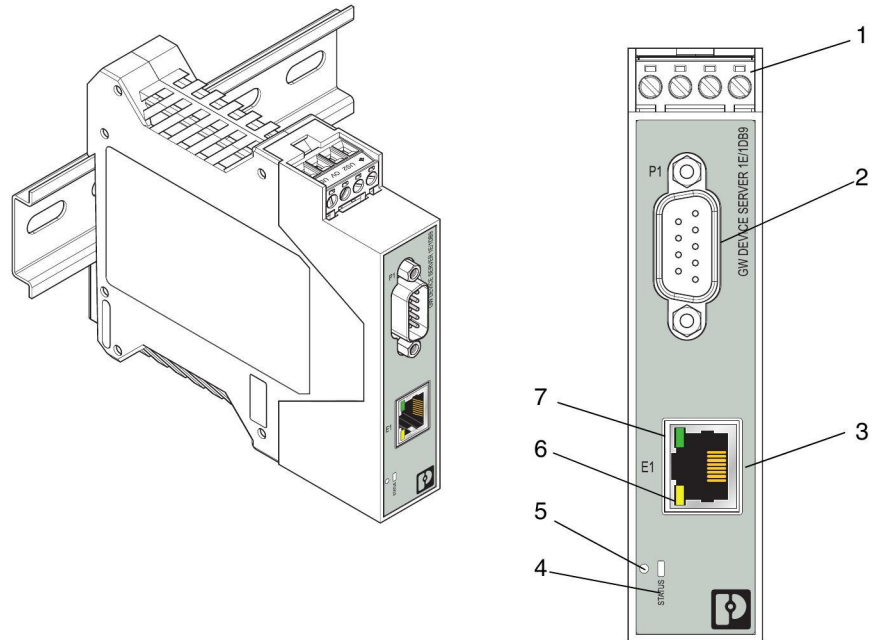


Figure 1-1 GW DEVICE SERVER 1E/1DB9

Table 1-2 GW DEVICE SERVER 1E/1DB9 structure

Item	Description
1	Power connector
2	P1 D-SUB 9 connector
3	Ethernet port (RJ45)
4	Status LED
5	Reset button
6	Ethernet activity status LED
7	Ethernet link status LED

GW DEVICE SERVER 1E/2DB9

The GW DEVICE SERVER 1E/2DB9 features one Ethernet port and two RS-232/422/485 serial ports with D-SUB 9 connectors.

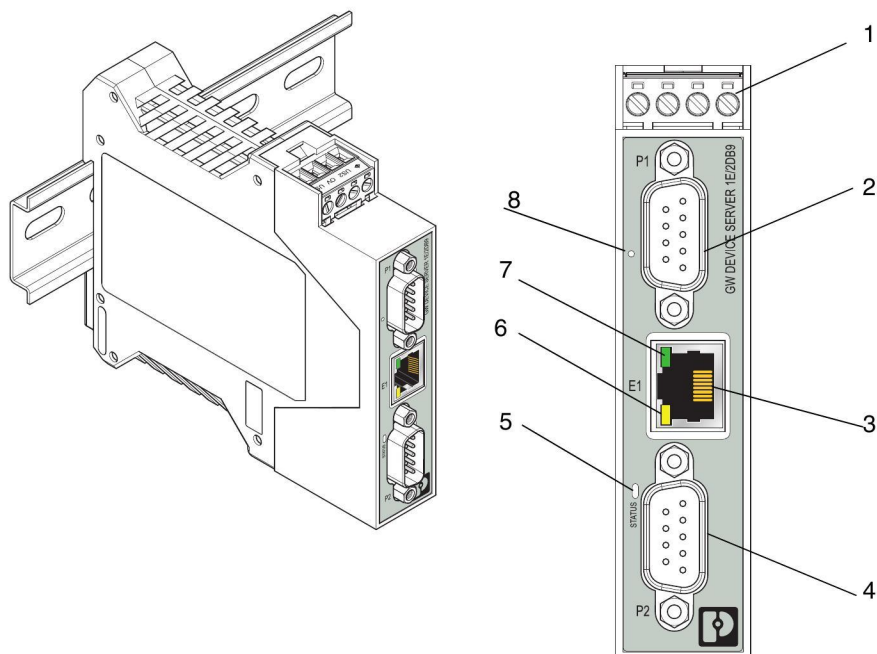


Figure 1-2 GW DEVICE SERVER 1E/2DB9

Table 1-3 GW DEVICE SERVER 1E/2DB9 structure

Item	Description
1	Power connector
2	P1 D-SUB 9 connector
3	Ethernet port (RJ45)
4	P2 D-SUB 9 connector
5	Status LED
6	Ethernet activity status LED
7	Ethernet link status LED
8	Reset button

GW DEVICE SERVER 2E/2DB9

The GW DEVICE SERVER 2E/2DB9 features two Ethernet ports with integrated switch functionality and two RS-232/422/485 serial ports with D-SUB 9 connectors.

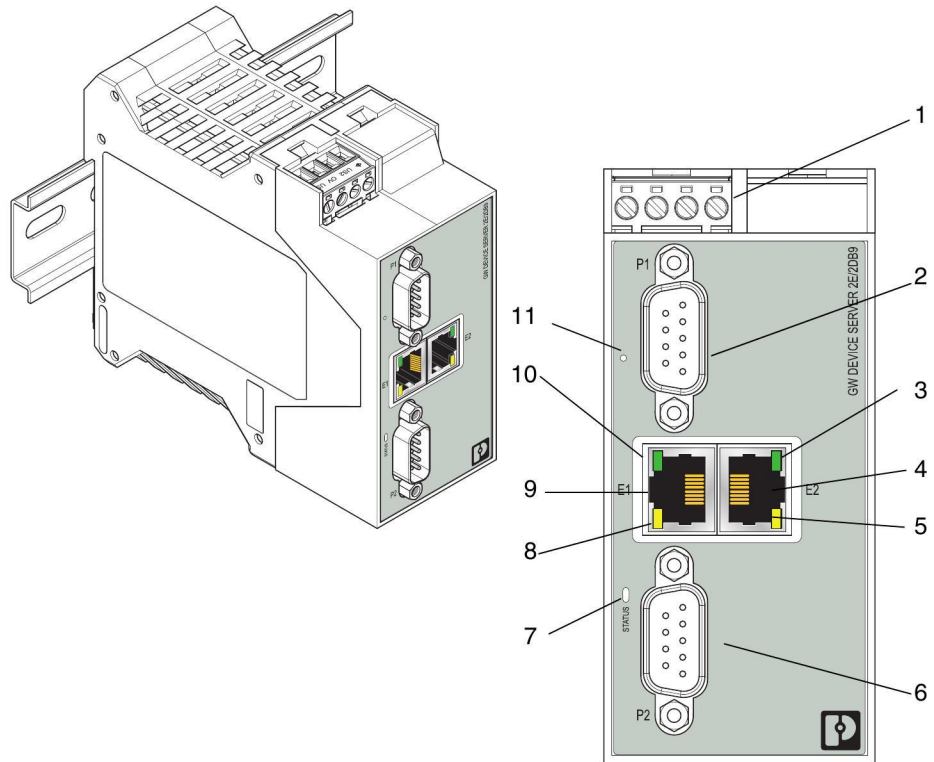


Figure 1-3 GW DEVICE SERVER 2E/2DB9

Table 1-4 GW DEVICE SERVER 2E/2DB9 structure

Item	Description
1	Power connector
2	P1 D-SUB 9 connector
3	Ethernet link status LED
4	E2 Ethernet port (RJ45)
5	Ethernet activity status LED
6	Status LED
7	P2 D-SUB 9 connector
8	Ethernet activity status LED
9	E1 Ethernet port (RJ45)
10	Ethernet link status LED
11	Reset button

GW DEVICE SERVER 2E/4DB9

The GW DEVICE SERVER 2E/4DB9 features two Ethernet ports with integrated switch functionality and four RS-232/422/485 serial ports with D-SUB 9 connectors.

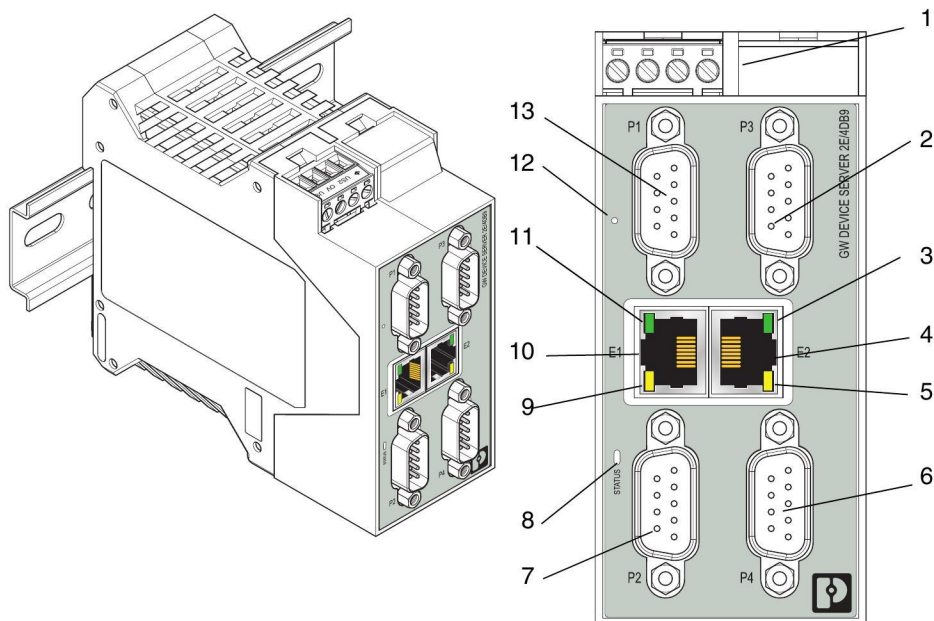


Figure 1-4 GW DEVICE SERVER 2E/4DB9

Table 1-5 GW DEVICE SERVER 2E/4DB9 structure

Item	Description
1	Power connector
2	P3 D-SUB 9 connector
3	Ethernet link status LED
4	E2 Ethernet port (RJ45)
5	Ethernet activity status LED
6	P4 D-SUB 9 connector
7	P2 D-SUB 9 connector
8	Status LED
9	Ethernet activity status LED
10	E1 Ethernet port (RJ45)
11	Ethernet link status LED
12	Reset button
13	P1 D-SUB 9 connector

2 Installation

2.1 Safety regulations and installation notes

Installation, operation, and maintenance may be carried out only by qualified electricians. Follow the specified installation instructions. The applicable specifications and safety directives (including the national safety directives), as well as the general technical regulations, must be observed during installation and operation. The technical data should be taken from the packaging instructions and the certificates (conformity assessment, other possible approvals).

Opening the device or making changes to it is not permitted. Do not repair the device yourself, but replace it with an equivalent device. Repairs may be carried out only by the manufacturer. The manufacturer is not liable for any damage caused by violation of the prescribed regulations.

The IP20 degree of protection (EN 60529) of the device is intended for a clean and dry environment.

Do not subject the device to any load that exceeds the prescribed limits.

The device is not designed for use in environments with danger of dust explosions.

2.2 Mounting

To mount on the DIN rail:

1. Place the device onto the DIN rail from above (A), so that the upper housing keyway hooks onto the top edge of the DIN rail.
2. Hold the device by the housing cover and carefully push the device toward the mounting surface (B).
3. After the foot is snapped onto the DIN rail, verify that it is attached securely.

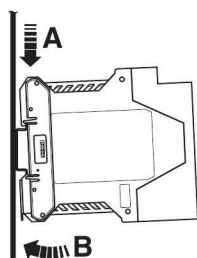


Figure 2-1 DIN rail mounting

To remove:

1. Use a suiPAGELE screwdriver to release the locking mechanism (A) on the snap-on foot of the device.
2. Hold onto the device by the housing cover and carefully tilt it upward (B).
3. Remove the device from the DIN rail (C).

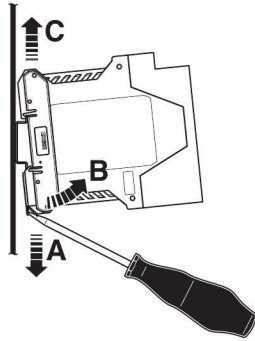


Figure 2-2 DIN rail removal

2.3 Data interfaces

2.3.1 Connecting the V.24 (RS-232) cable

The D-SUB 9 connector may function as an RS-232, RS-422, or RS-485 interface. The RS-232 interface is a data terminal equipment (DTE) device that behaves like a personal computer (PC). A null modem cable or adapter is required to connect to a PC.



The V.24 (RS-232) interface of the GW DEVICE SERVER... is a DTE assignment.

Connect the GW DEVICE SERVER... to the V.24 (RS-232) device to be connected (for example, a PC) by way of the PSM-KA-9SUB 9/BB/2 METER V.24 (RS-232) cable (Order No. 2799474). The cable is an interface cable with 1:1 connected contacts.

Table 2-1 D-SUB 9 to RS-232 pin out

	GW DEVICE SERVER...	End device			
	RS-232	D-SUB 9 (DCE)	D-SUB 9 (DTE)	D-SUB 25 (DCE)	D-SUB 25 (DTE)
1	DCD	1	4	8	20
2	RxD	2	3	3	2
3	TxD	3	2	2	3
4	DTR	4	1, 6	20	6, 8
5	GND	5	5	7	7
6	DSR	6	4	6	20
7	RTS	7	8	4	5
8	CTS	8	7	5	4
9	RI	9	-	22	-

2.3.2 Connecting the RS-422 cable

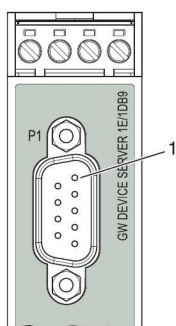


Figure 2-3 Pin 1 location

In RS-422 mode, a point-to-point connection can be established. Use a twisted-pair, common shielded bus cable to connect the I/O device.

To connect the RS-422 cable:

1. Connect the individual conductors of the data cable to the GW DEVICE SERVER... using a SUBCON 9/F SH (Order no. 2761499).
2. Make sure the signal assignment is correct.
This operating mode supports full duplex transmission mode.

Table 2-2 D-SUB 9 to RS-422 pr RS-485 pin out

	GW DEVICE SERVER...		End device	
	RS-422	RS-485	RS-422	RS-485
2	T(A)	–	D(A)	–
3	D(A)	T(A)	3	D(A)
5	GND	GND	GND	GND
7	D(B)	D(B)	T(B)	D(B)
8	D(B)	–	D(B)	–

2.3.3 Connecting the RS-485 cable

In RS-485 mode, an RS-485 network with several I/O devices can be created. Use a twisted-pair, common shielded bus cable to connect the I/O devices.

Connect the individual conductors of the data cable to the GW DEVICE SERVER... using a SUBCON 9/F SH (Order no. 2761499)(see Table 2-2).



NOTE:

Observe the polarity of the RS-485 cable.

Fit this bus cable with a termination network at the two furthest points of the RS-485 network.

The termination resistors are integrated in the GW DEVICE SERVER... and can be switched on through the web-based management interface.

2.3.4 Connecting the Ethernet cable

The GW DEVICE SERVER... has an Ethernet interface on the front in RJ45 format, to which only twisted-pair cables with an impedance of 100 Ω can be connected. The data transmission rate is either 10 or 100 Mbps. The GW DEVICE SERVER... supports the auto negotiation function for automatic selection of the transmission speed, as well as an automatic crossover feature for the automatic selection of line or crossover cabling.

Push the Ethernet cable with the crimped RJ45 connector into the GW DEVICE SERVER...until it engages with a click.

2.3.4.1 Models with two Ethernet ports

When using two Ethernet ports, the GW DEVICE SERVER... is classified as a switch. When using only one port, it is a simple end node device. The maximum number of daisy-chained GW DEVICE SERVER... units, and the maximum distance between units, is based on the Ethernet standards and is determined by the environment and conformity of the network to these standards. There may be some performance degradation on the devices at the end of the chain, so it is recommended to overload and test for performance in the environment. The application may also limit the total number of ports that may be installed. Some basic guidelines are listed below.

- Ethernet 10BASE-T rules
 - The maximum number of repeater segments is four.
 - Use Category 3 or 5 twisted-pair 10BASE-T cables. The maximum length of each cable is 100 m (328 ft.).
- Fast Ethernet 100BASE-TX rules
 - The maximum number of repeater segments is two (for a Class II hub). A Class II hub can be connected directly to one other Class II Fast Ethernet hub. A Class I hub cannot be connected directly to another Fast Ethernet hub.
 - Category 5 twisted-pair cable must be used. The maximum length of each twisted-pair cable is 100 m (328 ft.).
 - The total length of twisted-pair cabling (across directly connected hubs) must not exceed 205 m (672 ft.).
- IEEE 802.3 specification: A network using repeaters between communicating stations (PCs) is subject to the 5-4-3 rule of repeater placement on the network:
 - Five segments connected on the network.
 - Four repeaters.
 - Three segments of the fiber segments can have stations connected. The other two segments must be inter-repeater link segments with no stations connected.

2.4 Connecting the power supply



CAUTION:

Incorrect connection may result in damage to equipment and/or serious personal injury. Only qualified personnel may connect the power, start up, and operate this device. According to the safety instructions in this text, qualified personnel are persons who are authorized to start up, to ground, and to mark devices, systems, and equipment according to the standards of safety technology. In addition, these persons must be familiar with all warning instructions and maintenance measures in this text. Disregarding this warning may result in damage to equipment and/or serious personal injury.

The device can be connected to a single power source or two power sources for redundancy. The GW DEVICE SERVER... is powered using a +24 V DC SELV power supply. The power supply is connected by way of COMBICON plug-in screw terminal blocks (24 V and 0 V).

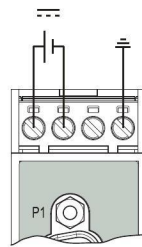


Figure 2-4 Single power supply connection

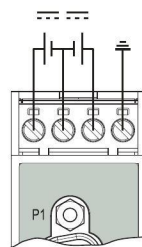


Figure 2-5 Redundant power supply connection

3 Configuration and startup

3.1 Default settings

The default network settings of the GW DEVICE SERVER... are:

IP address: 192.168.254.254

Subnet mask: 255.255.255.0

Gateway: 0.0.0.0



The default settings are invoked whenever the system is reset.

3.2 Web-based management

The user-friendly, web-based management interface, a graphical user interface (GUI), can be used to manage the GW DEVICE SERVER... from anywhere in the network using a standard browser. Comprehensive configuration and diagnostic functions, including a wide range of information about the device itself, the current parameters, and the operating state, are clearly displayed.

3.3 Login

To login:

1. Set the IP address of the connected PC to the sub-network of the GW DEVICE SERVER...: for example, IP = 192.168.254.10, sub-network = 255.255.255.0.
2. Open a web browser and enter the IP address of the GW DEVICE SERVER... in the "Address" field (default = 192.168.254.254).

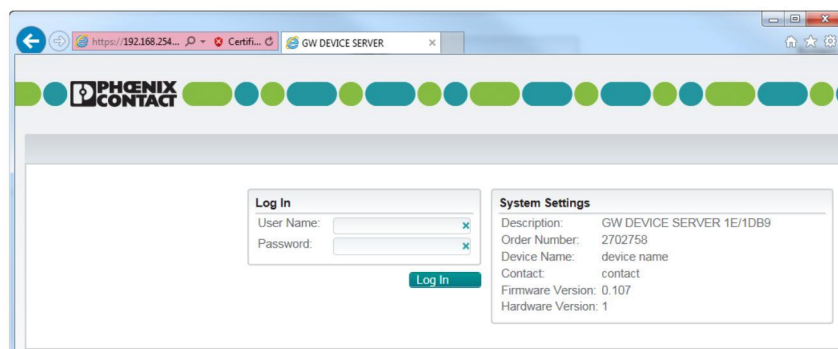


Figure 3-1 "Login" screen

The web server responds immediately.



If the web server does not load, first check the IP parameters of the PC. If everything is set correctly, check to see if there are any proxy settings loaded in the web browser. The proxy setting must be set to “Load automatically” or “Deactivated” to properly establish communication.

3. Enter the credentials to access the web server configuration pages. The default credentials are:
User name: Admin
Default password: admin



Powering multiple devices with factory default IP addresses causes a network conflict, and incorrect parameters may be set in the GW DEVICE SERVER... modules. When programming modules for the first time, it is important to apply power to only one at a time, and change the IP address of each module to a unique IP address. Once all devices have a unique IP address, they can be powered on together while on the same network.

3.4 Home screen

Immediately after login, the “Home” screen is displayed. From the Home screen, the basic settings of the GW DEVICE SERVER... can be immediately configured by clicking on the appropriate Ethernet port or serial port in the diagram of the module.

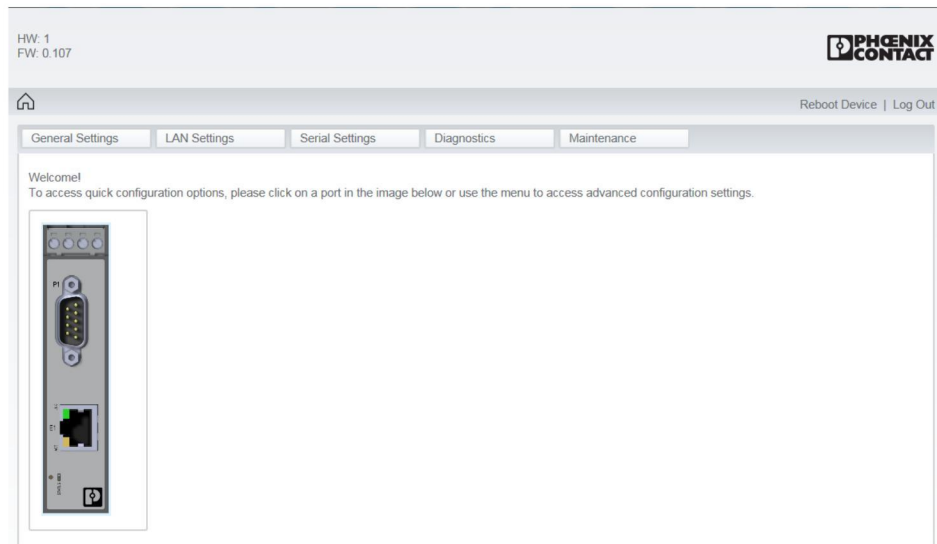


Figure 3-2 “Home” screen

Advanced settings can be accessed through the menu at the top of the screen. The “Home” screen can be accessed at any time by clicking the “Home” button in the upper left corner of the web-based management interface.

3.5 General settings

To view and edit general settings:

1. Click the “General Settings” tab to view and edit general information about the GW DEVICE SERVER....

The screenshot shows the 'General Settings' page for a Phoenix Contact device. At the top left, it displays 'HW: 1' and 'FW: 0.107'. The Phoenix Contact logo is in the top right. Below the header, there are navigation tabs: 'General Settings' (selected), 'LAN Settings', 'Serial Settings', 'Diagnostics', and 'Maintenance'. The main content area is titled 'Device Identification' and contains two input fields: 'Device Name' with the value 'device name' and 'Contact' with the value 'contact'. An 'Apply Changes' button is located at the bottom right of the form.

Figure 3-3 “General Settings” page

2. View the listed information.
3. If desired, change the listed information.

The “Device Identification” group provides fields for entering descriptive information about individual devices.

Device Name: Enter a name for the device. The field accepts up to 16 characters.

Contact: Enter the name of a contact person, group, or department responsible for this device. The field accepts up to 16 characters.

3.6 LAN settings

3.6.1 IP address

To enter the IP address:

1. From the “LAN Settings” page, click the “IP Address” tab to access the “IP Address” page.

The screenshot shows the 'LAN Settings/IP Address' page. At the top left, it displays 'HW: 1' and 'FW: 0.107'. The Phoenix Contact logo is in the top right. Below the header, there are navigation tabs: 'General Settings', 'LAN Settings' (selected), 'Serial Settings', 'Diagnostics', and 'Maintenance'. The main content area has two sub-tabs: 'IP Address' (selected) and 'Security'. Under 'IP Address', there are two radio buttons: 'Automatic address assignment (DHCP)' and 'Manual address assignment' (selected). Below these are three input fields: 'IP Address' with the value '192.168.254.254', 'Subnet Mask' with the value '255.255.255.0', and 'Default Gateway' which is empty. To the right, there is a 'Hardware Address' field with the value '00:A0:45:D4:09:03'. An 'Apply Changes' button is located at the bottom right.

Figure 3-4 “LAN Settings/IP Address” page

2. Select the method for assigning the LAN IP address.
 If a DHCP server assigns IP addresses, click the “Automatic address assignment (DHCP)” button.
 If using static IP addresses, click the “Manual address assignment” button and enter the appropriate information in the various fields.
MAC Address: the MAC Address of the GW DEVICE SERVER... is displayed.
3. Click the “Apply Changes” button to save the configuration.

3.6.2 Security

The GW DEVICE SERVER... includes several security options for data encryption and device authentication.

To configure security settings:

1. From the “LAN Settings” page, click the “Security” tab.

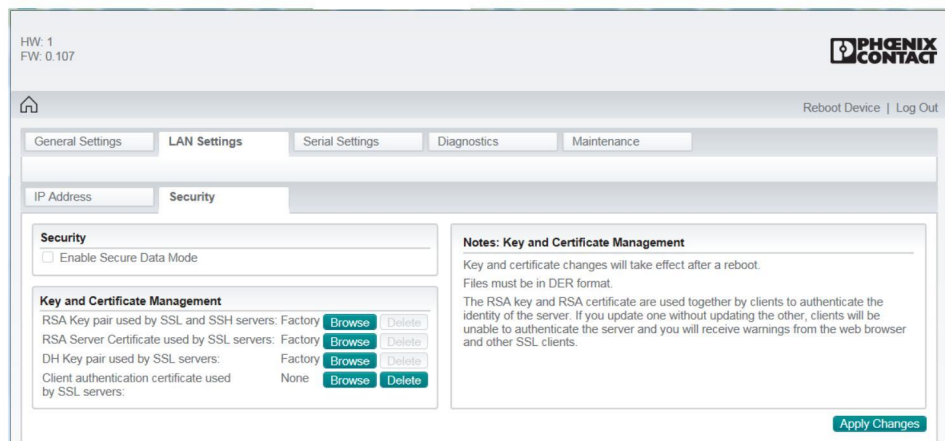


Figure 3-5 “LAN Settings/Security” page

2. If desired, click the “Enable Secure Data Mode” box.
 When Secure Data mode is enabled, TCP connections that carry data to/from the serial ports are encrypted using SSL or TLS security protocols.
 TCP connections to the per-serial-port TCP ports (default is 8000, 8001, 8002, for example) are encrypted using SSL/TLS. TCP connections to TCP port 4606, on which the GW DEVICE SERVER... implements the proprietary serial driver protocol, are encrypted using SSL/TLS. Since SSL/TLS cannot be used for either UDP data streams or for the proprietary MAC mode Ethernet driver protocol, both UDP and MAC mode serial data transport features are disabled.
3. Select Key and Certificate Management files.
 In addition to encrypting the data streams, it is possible to configure the GW DEVICE SERVER... so that only authorized client applications can connect using SSL/TLS. For secure operation, the GW DEVICE SERVER... uses a set of four keys and certificates. These keys and certificates may be configured.
RSA Key pair used by SSL and SSH servers: This is a private/public key pair that is used for two purposes:
 - It is used by some cipher suites to encrypt the SSL/TLS handshaking messages. Possession of the private portion of this key pair allows an eavesdropper to decrypt traffic on SSL/TLS connections that use RSA encryption during handshaking.

- It is used to sign the Server RSA Certificate in order to verify that the GW DEVICE SERVER... is authorized to use the server RSA identity certificate.



Possession of the private portion of this key pair allows somebody to pose as the GW DEVICE SERVER....

If the Server RSA Key is to be replaced, a corresponding RSA identity certificate must also be generated and uploaded, or clients will not be able to verify the identity certificate.

RSA Server Certificate used by SSL servers: This is the RSA identity certificate that the GW DEVICE SERVER... uses during SSL/TLS handshaking to identify itself. It is used most frequently by SSL server code in the GW DEVICE SERVER... when clients open connections to the GW DEVICE SERVER...'s secure web server or other secure TCP ports. If a GW DEVICE SERVER... serial port configuration is set up to open (as a client) a TCP connection to another server device, the GW DEVICE SERVER... also uses this certificate to identify itself as an SSL client if requested by the server.

In order to function properly, this certificate must be signed using the Server RSA Key. This means that the server RSA certificate and server RSA key must be replaced as a pair.

DH Key pair used by SSL servers: This is a private/public key pair that is used by some cipher suites to encrypt the SSL/TLS handshaking messages.



Possession of the private portion of the key pair allows an eavesdropper to decrypt traffic on SSL/TLS connections that use DH encryption during handshaking.

Client Authentication Certificate used by SSL servers: If configured with a CA certificate, the GW DEVICE SERVER... requires all SSL/TLS clients to present an RSA identity certificate that has been signed by the configured CA certificate. As shipped, the GW DEVICE SERVER... is not configured with a CA certificate and all SSL/TLS clients are allowed.



All GW DEVICE SERVER... units are shipped from the factory with identical configurations. They all have the identical, self-signed, Phoenix Contact Server RSA Certificates, Server RSA Keys, Server DH Keys, and no Client Authentication Certificates.

For maximum data and access security, you should configure all GW DEVICE SERVER... units with custom certificates and keys.

Client authentication

If desired, controlled access to SSL/TLS protected features can be configured by uploading a client authentication certificate to the GW DEVICE SERVER.... By default, the GW DEVICE SERVER... is shipped without a CA (Certificate Authority) and therefore allows connections from any SSL/TLS client.

If a CA certificate is uploaded, the GW DEVICE SERVER... allows only SSL/TLS connections from client applications that provide to the GW DEVICE SERVER... an identity certificate that has been signed by the CA certificate that was uploaded to the GW DEVICE SERVER....

This uploaded CA certificate that is used to validate a client's identity is sometimes referred to as a "trusted root certificate", a "trusted authority certificate", or a "trusted CA certificate". This CA certificate may be that of a trusted commercial certificate authority, or it may be a privately generated certificate that an organization creates internally to provide a mechanism to control access to resources that are protected by the SSL/TLS protocols.

3.7 Serial settings

1. Click the “Serial Settings” tab to configure the serial port(s). The “Overview” page provides a quick summary of the current configuration of the serial port(s).
2. Click the appropriate configuration tab to edit the configuration of that port.

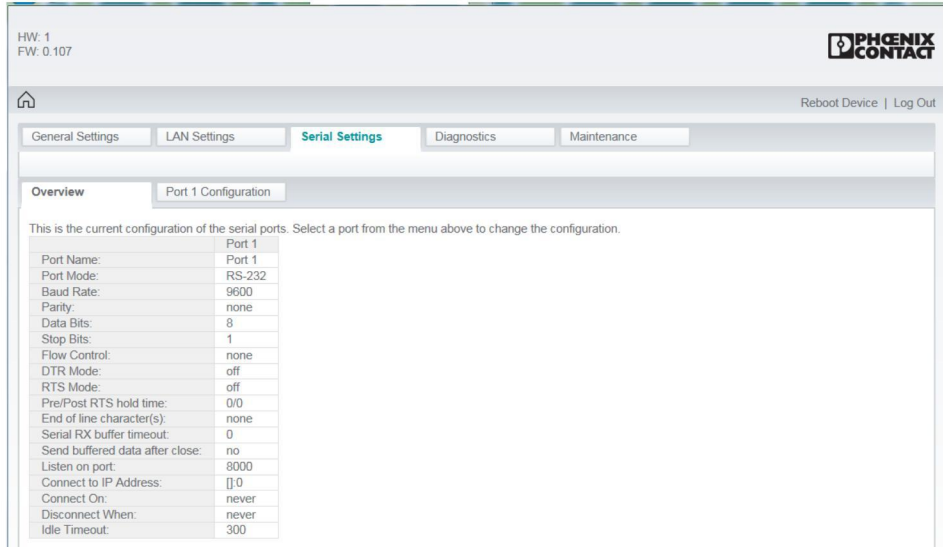


Figure 3-6 “Serial Settings/Overview” page

3.7.1 Port configuration

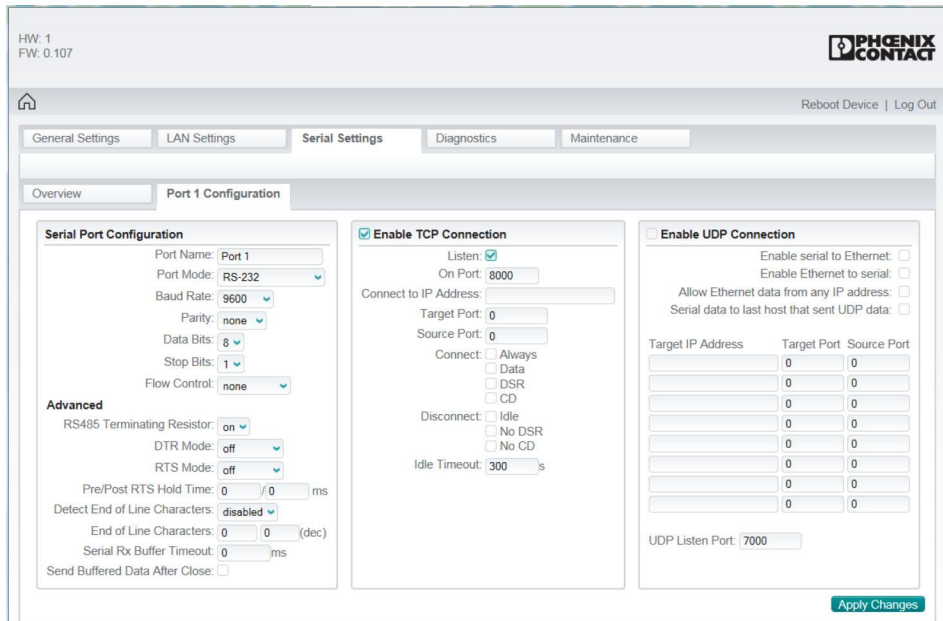


Figure 3-7 “Serial Settings/Port 1 Configuration” page

3.7.1.1 Serial port configuration

1. From the “Serial Settings” page, click the “Port Configuration” tab.
2. In the “Serial Port Configuration” group, specify the settings of each serial port to match the connected serial device.

Figure 3-8 “Serial Port Configuration” group

Port Name: Enter a label for the port. This could correspond to the connected device, for example, “Shipping Label Scanner”, for easy identification.

Port Mode: Select the port operating mode. Available settings are **RS-232**, **RS-422**, **RS-485 two-wire (half duplex)**, **RS-485 four-wire Master**, and **RS-485 four-wire Slave**. When **RS-485 four-wire Master** is selected, the RS-485 transmitter is always enabled on the GW DEVICE SERVER.... When **RS-485 4-wire Slave** is selected, the RS-485 transmitter is enabled only when the GW DEVICE SERVER... has data to send. This is important when a four-wire RS-485 multidrop network is installed.

Baud rate: Choose the baud rate of the serial port; 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, and 230400 bps are supported.

Parity: Select odd, even, mark, space, or none.

Data Bits: Choose 5, 6, 7, or 8 data bits.

Stop Bits: Select 1 or 2 stop bits.

Flow Control: Available options for RS-232 flow control are **Hardware CTS/RTS**, **Software Xon/Xoff**, and **None**.

3. Edit advanced settings, depending on the application.

Terminating Resistor: The terminating resistor is used only in RS-485 networks. If the GW DEVICE SERVER... is the last device in the RS-485 network, enable the terminating resistor.

DTR Mode: Select **on all the time**, **off all the time**, or use **socket on** when a connection is established on this port.

RTS Mode: Choose **on all the time**, **off all the time**, **socket on**, or **toggle**. Use **socket on** if you want RTS turned on when a connection is established on this port. Use **toggle** to turn RTS on when data is being transmitted and turned off upon completion of data transmission.



The RTS Mode “Toggle” may be used only when Flow Control is set to **None**.



If RTS should remain turned on after the TCP connection is closed, check the Send Buffered Data After Close option. RTS remains on until the Post RTS Hold Time expires. Otherwise, any buffered data is discarded and RTS is turned off immediately after the TCP connection is closed.

Pre/Post RTS Hold Time: If the RTS Mode is set to **toggle**, the GW DEVICE SERVER... turns RTS on and waits for the Pre RTS Hold Time before starting data transmission. After the data transmission is completed, RTS remains on for the Post RTS Hold Time. The Pre/Post RTS Hold Time can be configured to values from 0 ms to 4,294,967,295 ms (approximately 49 days).

Detect End of Line Characters: If enabled (1 byte or 2 bytes), the GW DEVICE SERVER... buffers receive serial data until the configured 1 or 2 byte End of Line Characters are received. When that sequence has been received, the buffered data (including the End of Line sequence) is written to the Ethernet network.

End of Line Characters: Enter the End of Line characters in decimal format if the Detect End of Line Characters option is enabled.

Serial Rx Buffer Timeout: The GW DEVICE SERVER... can buffer receive serial data until a gap in the serial receive data stream has been detected. This gap can be configured to values from 1 ms to 4,294,967,295 ms (approximately 49 days).

Send Buffered Data After Close: Check the box if serial data that is still held in the buffer of the GW DEVICE SERVER... should be transmitted when the connection is closed by the application.



The maximum amount of receive data that is buffered is 8 kB. If the 8 kB receive buffer is filled, the buffered data is written to the network even though an End of Line character or timeout has not been detected.

3.7.1.2 TCP connection

In the “TCP Connection” group, specify the TCP settings of the Ethernet port.

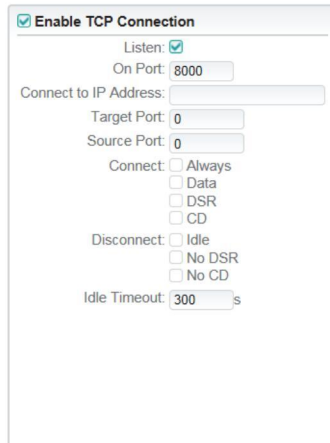


Figure 3-9 “Enable TCP Connection” group

Enable TCP Connection: This must be enabled to use the port as a socket or to use security with the Windows driver.

Listen: Check the “Listen” box so that the GW DEVICE SERVER... listens for incoming TCP/IP socket connections on the port number specified in the “On Port” field.

On Port: Changes the default TCP port number on which the GW DEVICE SERVER... listens for connections. This is the actual socket value used for this physical serial port. This number must not be duplicated under this IP address.

Connect to IP Address: Enter the IP address for which the GW DEVICE SERVER... should initiate a connection.

Target Port: Enter a TCP port number to which the GW DEVICE SERVER... should initiate a connection.

Source Port: Enter the TCP port number on which the GW DEVICE SERVER... should listen for data.

Connect: Select the conditions under which the GW DEVICE SERVER... should initiate a TCP connection (it initiates a connection only when a connection is not already established).

- **Always:** Always initiates a connection and maintains a persistent connection.
- **Data:** Initiates a connection when data is received.
- **DSR:** Initiates a connection when DSR is active.
- **CD:** Initiates a connection when CD is active.

Disconnect:

- **Idle:** Closes the connection if no data has been transmitted or received for the number of seconds specified by Idle Timeout.
- **No DSR:** Closes the connection when DSR goes inactive.
- **No CD:** Closes the connection when CD goes inactive.



If **Always** is selected as the “Connect” value, a “Disconnect” selection is not required.

Idle Timeout: The Idle Timeout is the number of seconds before a disconnect occurs if the Disconnect Idle option is selected.

3.7.1.3 UDP Connection

Enable UDP Connection

Enable serial to Ethernet:

Enable Ethernet to serial:

Allow Ethernet data from any IP address:

Serial data to last host that sent UDP data:

Target IP Address	Target Port	Source Port
<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

UDP Listen Port:

Figure 3-10 “UDP Connection” group

The UDP connection provides a very flexible means of managing Ethernet traffic to and from the GW DEVICE SERVER.... Data flow from Ethernet to serial, or vice versa, can be managed to send data to specific devices or receive.

Enable UDP Connection: Check the box to enable UDP connections.

Enable serial to Ethernet: When this option is enabled, it allows data from the serial port of the GW DEVICE SERVER... to be forwarded on to the Ethernet network. If it is not enabled, serial data will not be forwarded to the Ethernet network.

Enable Ethernet to serial: When this option is enabled, it allows data from the Ethernet network to be forwarded to the serial port of the GW DEVICE SERVER.... When it is not selected, it prevents data from the Ethernet network from being forwarded on to the serial port.

Allow Ethernet data from any IP Address: This option permits data reception from any IP address rather than limiting it to the list of IP addresses. Use this option with the UDP Listen Port field.

This option may be used in conjunction with the **Target IP Address** and **Target Port** fields.

Serial data to last host that sent UDP data: If this option is checked, the GW DEVICE SERVER... sends serial data back to the last Ethernet device that sent UDP data. This is a simple way of providing acknowledgments or responding to requests.

Target IP Address: When the **Allow Ethernet data from any IP Address** or **Enable serial to Ethernet** option is enabled, enter the IP address of any devices that should receive the serial data forwarded from the GW DEVICE SERVER.... If no IP address is entered, no data is sent from the GW DEVICE SERVER....

Additionally, IP addresses of devices which are allowed to send data to the GW DEVICE SERVER... may be entered if the **Enable Ethernet to Serial** option is NOT checked.

Target Port: Enter the TCP Port number to which the serial data should be forwarded.

Source Port: Enter the TCP Port number where the Ethernet data shall be received by the GW DEVICE SERVER....

UDP Listen Port: Enter the port number to be used to listen for UDP data coming from the Ethernet network if **Allow Ethernet data from any IP Address** is selected.

3.8 Diagnostics

To view any diagnostics data:

1. Click the "Diagnostics" tab to view a variety of packet statistics that can be used to diagnose a configuration or application problem.

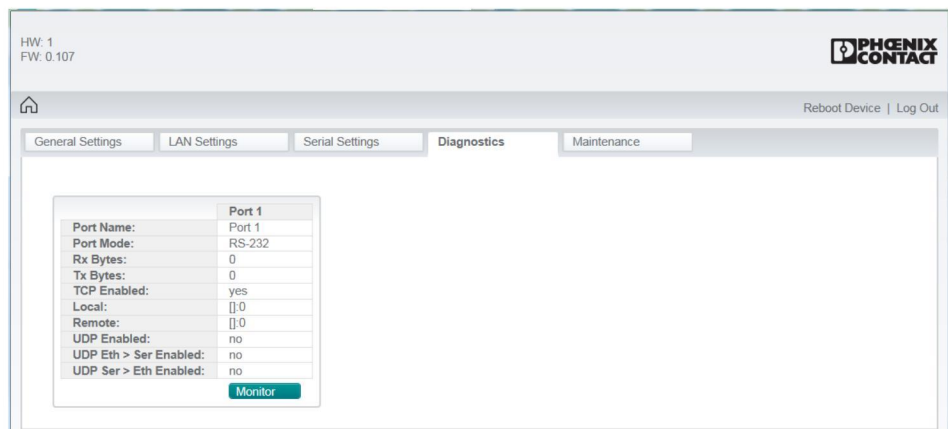


Figure 3-11 "Diagnostics" page

Rx Bytes: Indicates the number of bytes received by the serial port of the GW DEVICE SERVER....

Tx Bytes: Indicates the number of bytes transmitted by the serial port of the GW DEVICE SERVER....

Local: Displays the IP Address and TCP Port number of the local connection.

Remote: Displays the IP Address and TCP Port number of the remotely connected device.

- Click the “Monitor” button to watch a live stream of the serial port data flow. The “Monitor” feature is similar to a Hyperterminal[®] screen and shows characters transmitted and received by the serial port. This is very useful in determining configuration or cabling errors.

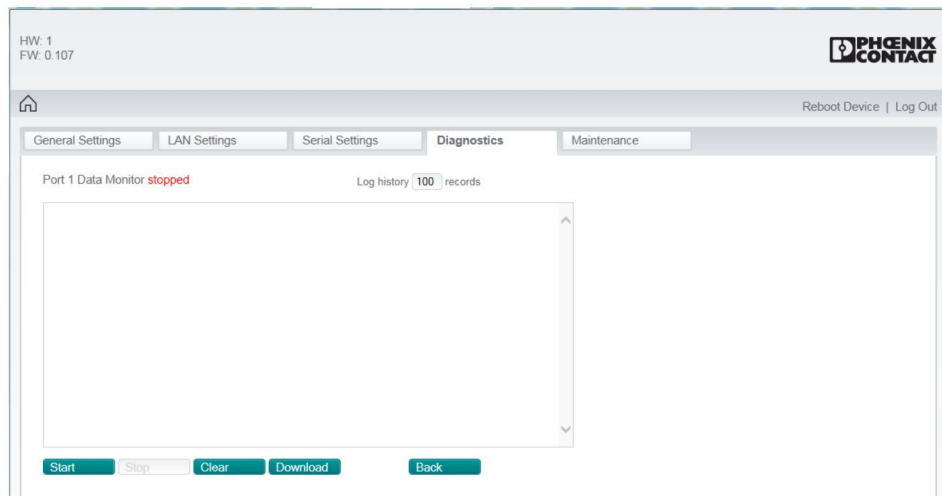


Figure 3-12 Monitor function (stopped)

- Set the “Log history” field to configure the maximum number of lines captured by the monitor before the oldest entries are removed. The monitor capture can also be saved as a .txt file for later review or analysis.

3.9 Maintenance

Click the “Device Maintenance” tab to access the available maintenance functions of the GW DEVICE SERVER....

3.9.1 Passwords

To change passwords:

1. From the “Maintenance” page, click the “Passwords” tab to change the password used to access the web server.

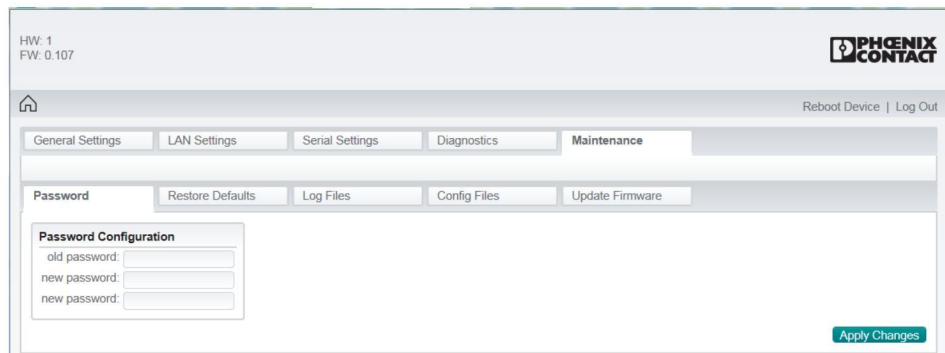


Figure 3-13 “Maintenance/Password” page

The GW DEVICE SERVER... has administrator-level passwords. The administrator-level user may make changes to the configuration.

The default user name and password are:

User name: Admin

Password: admin

The “Password” field is case sensitive. The user name is fixed and cannot be modified.

2. To change a password, enter the current password and the new password (twice) in the appropriate fields.
3. Click the “Apply Changes” button to save changes.

3.9.2 Restore defaults

To restore defaults:

1. From the “Device Maintenance” page, click the “Restore Defaults” tab to return the GW DEVICE SERVER... to the original factory defaults, including the IP address.

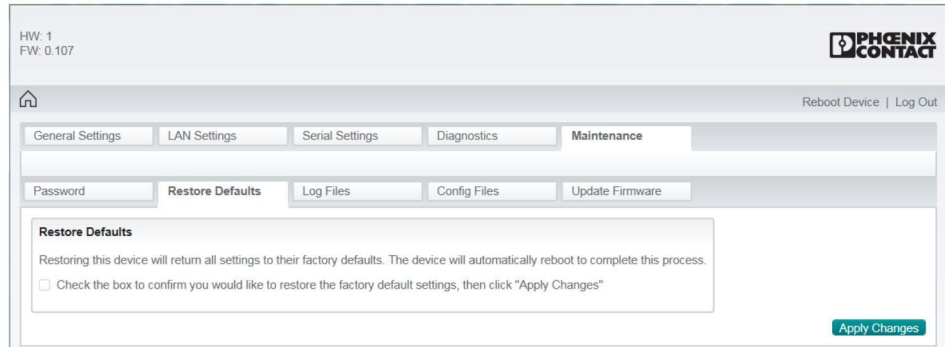


Figure 3-14 “Maintenance/Restore Defaults” page

2. Check the “Check the box to confirm...” box.
3. Click the “Apply Changes” button.

Note that the IP address returns to the factory defaults and may require modification to prevent multiple devices on the network from trying to use the same address.

3.9.3 Log files

To view log files:

1. From the “Device Maintenance” page, click the “Log Files” tab to review the log files of the device, which can be used for advanced troubleshooting.

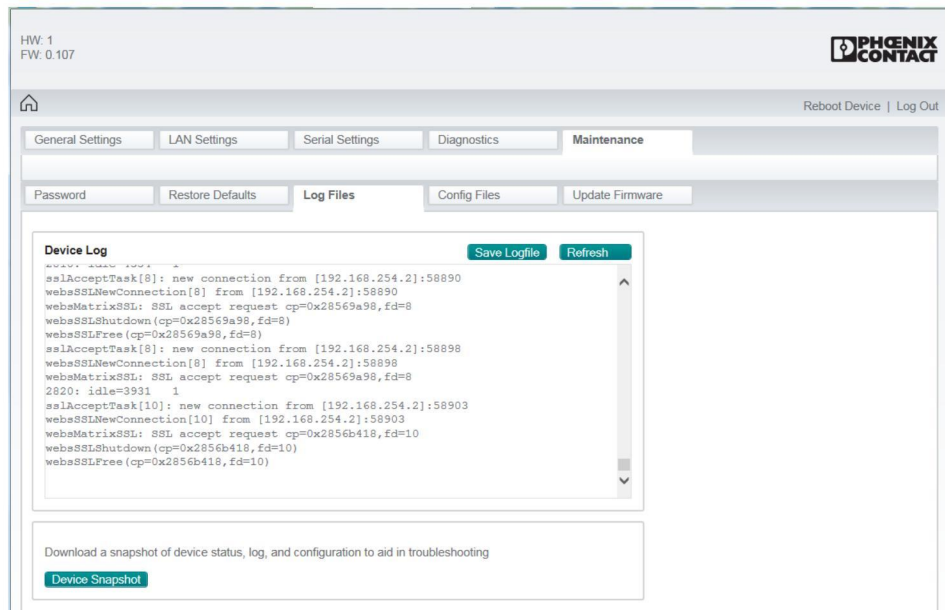


Figure 3-15 “Maintenance/Log Files” page

2. Click "Save Logfile" to save the log as a text file for future use, or review the log in the web browser.

The log displays information about the device, such as when a PC created or broke a connection to the GW DEVICE SERVER....

The "Device Snapshot" feature allows a user to capture the system log, configuration data, and other information that can be used for advanced troubleshooting or for "As Configured" record keeping as a single text file.

3.9.4 Configuration files

For fast and easy commissioning of a replacement unit, or in case many devices need the same configuration, it is possible to create and load a configuration file into the GW DEVICE SERVER....

To save and load configuration files:

1. From the "Maintenance" page, click the "Config Files" tab.

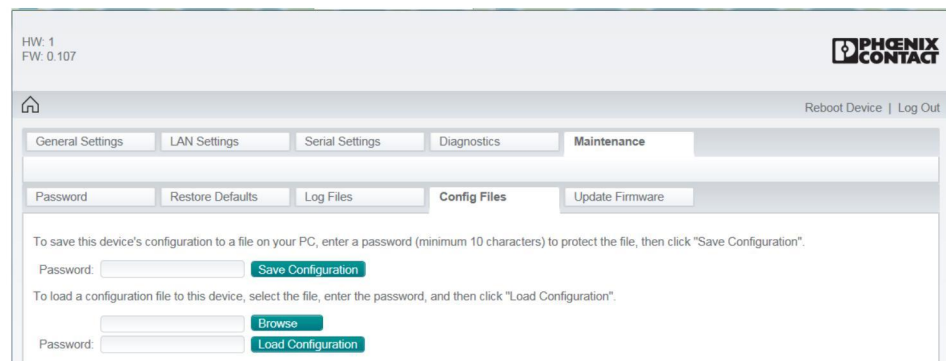


Figure 3-16 "Maintenance/Config Files" page

2. To create a configuration file, enter a password that is used to protect the file. The password prevents unauthorized users from applying the system configuration file to an unapproved node to gain access to the network.
3. Click "Save Configuration" to open a dialog box where the file name and storage location on the PC are selected.
4. To load a configuration file to a GW DEVICE SERVER..., click "Browse" to open a dialog box and browse to the configuration file location on the PC.
5. After selecting the appropriate configuration file, enter the password for the file and click "Load Configuration."

3.9.5 Update firmware

To update firmware:

1. From the “Maintenance” page, click the “Update Firmware” tab to install a new version of the firmware.

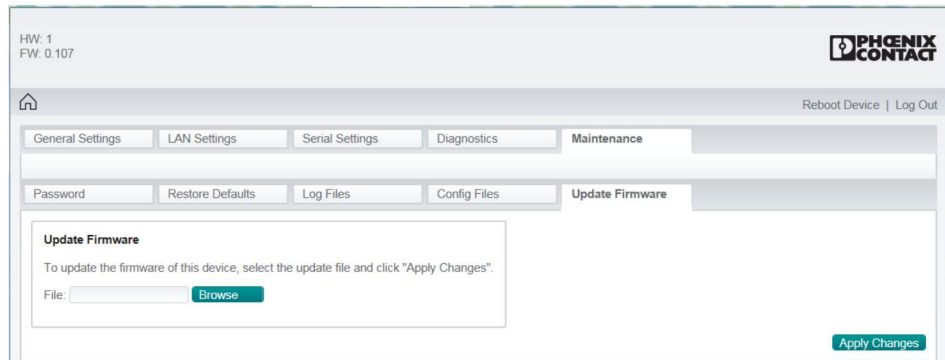


Figure 3-17 “Maintenance/Update Firmware” page

Occasionally, a new version of firmware may be provided to enhance operation of the GW DEVICE SERVER....

2. To install a new version of firmware, download the firmware to a local drive on the connected computer.
3. Click the “Choose File” button and navigate to the file in the “Browse” dialog box.
4. Highlight the file to select it, click the “Close” button.
5. Click the “Apply Changes” button to install the firmware.



NOTE:

Ensure that a reliable power connection is available during the firmware update. Do not restart the module or disconnect the Ethernet cable during this process



When firmware is updated, the device configuration is maintained.

4 Application examples

With its wide range of integrated functions, the GW DEVICE SERVER... can be used in various ways for different applications. The following applications are supported by the GW DEVICE SERVER....

4.1 Serial tunneling

A common application is the simple point-to-point connection of two serial devices through an existing network. For this cable replacement, the data is tunneled through the network using two GW DEVICE SERVER... modules, which removes any range restrictions, such as a maximum of 15 m for V.24 (RS-232). This connection also operates across sub-networks and gateways. Both GW DEVICE SERVER... modules are logically linked with one another by way of target and source IP.

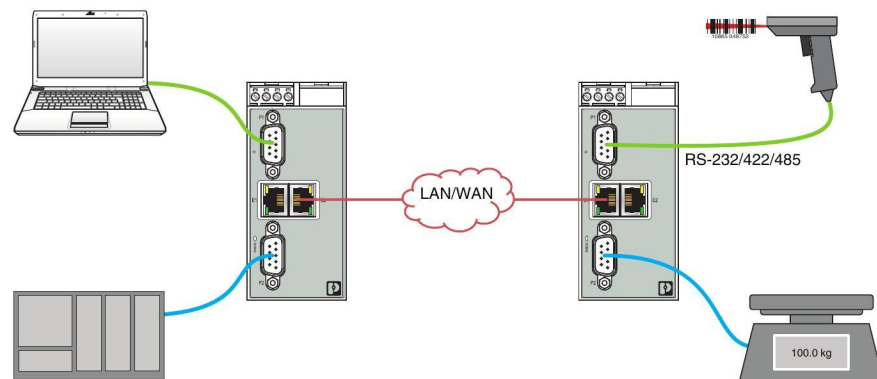


Figure 4-1 Serial tunneling

The application can be implemented with either a UDP or TCP/IP protocol. The TCP/IP protocol is connection-oriented. Connection establishment can be controlled by various conditions. The UDP protocol is connectionless, and data is transmitted as soon as it appears at the V.24 (RS-232) interface. It can be used in multiple unidirectional or bidirectional configurations, including point-to-point and point-to-multipoint.

4.1.1 Settings in TCP mode

The following parameters should be configured for each serial port on the GW DEVICE SERVER....

Table 4-1 TCP mode settings

Parameter	GW DEVICE SERVER... (A)	GW DEVICE SERVER... (B)	Explanation
Enable TCP connection	Enabled	Enabled	Use the TCP/IP protocol
Listen	Enabled	Enabled	Listen for data on a TCP port number entered in "On Port" field
On port	3001	3001	TCP communication port
Connect to IP address	IP address of device B	-	Device A initiates the connection to device B
Connect	Select how the connection is initiated	-	Device A initiates the connection to device B
Disconnect	Select how the connection is disconnected	-	Device A initiates the connection to device B

4.1.2 Unidirectional point-to-multipoint settings in UDP mode

Example 1:

A weigh scale connected to a GW DEVICE SERVER... sends data to multiple monitoring PCs. Each PC receives the data at the same time and has no need to acknowledge the receipt of the data from the scale.

The following parameters should be configured for each serial port on the GW DEVICE SERVER.... This configuration example assumes that data from a serial device connected to GW DEVICE SERVER... (A) is sent to multiple GW DEVICE SERVER... devices.

Table 4-2 Unidirectional point-to-multipoint settings in UDP

Parameter	GW DEVICE SERVER... (A)	GW DEVICE SERVER... (B, C, D...) ¹	Explanation
Enable UDP connection	Enabled	Enabled	Use the UDP protocol
Enable serial to Ethernet	Enabled	Disabled	Forward serial data from device A to the Ethernet network
Enable Ethernet to serial	Disabled	Enabled	Ethernet traffic is forwarded to the serial port of device B
Allow Ethernet data from any IP address	Disabled	Disabled	Ignore UDP traffic from other devices in the network
Target IP address	Enter the IP address(es) of Device B, C, D...	Enter the IP address of Device A	Device A sends data to device B
Target port	3001	–	Device A sends data to device B
UDP Listen port	–	3001	Device B should listen for UDP traffic on this port number

¹ Device B, C, D, etc., could be multiple serial ports on the same GW DEVICE SERVER...

4.1.3 Bidirectional point-to-multipoint settings in UDP mode

Example 2:

A milling machine connected to a GW DEVICE SERVER... sends its data to multiple monitoring PCs. Each PC receives the data at the same time. One PC needs to acknowledge the receipt of the data and all PCs need the capability to send new instruction sets to the milling machine. In the situation of all PCs responding at the same time, all of the data is intermingled. There is no means of differentiating the data to indicate the sending party. It is *imperative* that only one PC at a time sends data.

The following parameters should be configured for each serial port on the GW DEVICE SERVER.... This configuration example assumes that data from a serial device connected to GW DEVICE SERVER... (A) is sent to multiple GW DEVICE SERVER... devices.

Table 4-3 Bidirectional point-to-multipoint settings in UDP

Parameter	GW DEVICE SERVER... (A)	GW DEVICE SERVER...(B, C, D...) ¹	Explanation
Enable UDP connection	Enabled	Enabled	Use the UDP protocol
Enable serial to Ethernet	Enabled	Enabled	Forward serial data from device A to the Ethernet network
Enable Ethernet to serial	Enabled	Enabled	Ethernet traffic is forwarded to the serial port of device B
Allow Ethernet data from any IP address	Disabled	Disabled	Ignore UDP traffic from other devices in the network
Target IP address	Enter the IP address(es) of Device B, C, D...	Enter the IP address of Device A	Device A sends data to device B
Target port	3001	3001	Device A sends data to device B
UDP Listen port	3001	3001	Device B should listen for UDP traffic on this port number

¹ Device B, C, D, etc., could be multiple serial ports on the same GW DEVICE SERVER...

4.1.4 Unidirectional multipoint-to-point settings in UDP mode

Example 3:

A weigh scale is connected to each of the GW DEVICE SERVER... serial ports and sends its data to a single monitoring PC (COM2). Each scale sends its data in sequence and no two scales send data at the same time. This is critical as there is no means by which data can be identified in relation to its sending port, and the data is intermingled. For example: Port 1 sends ABCD and Port 2 sends 1234, both at the same time. The data seen in COM2 may be A1B2CD34.

Table 4-4 Unidirectional multipoint-to-point settings in UDP

Parameter	GW DEVICE SERVER... (A)	GW DEVICE SERVER... (B) ¹	Explanation
Enable UDP connection	Enabled	Enabled	Use the UDP protocol
Enable serial to Ethernet	Disabled	Enabled	Forward serial data from device A to the Ethernet network
Enable Ethernet to serial	Enabled	Disabled	Ethernet traffic is forwarded to the serial port of device B
Allow Ethernet data from any IP address	Disabled	Disabled	Ignore UDP traffic from other devices in the network
Target IP address	Enter the IP address of Device B	Enter the IP address of device A	Devices A and B send data to each other
Target port	3001	3001	Devices A and B send data to each other
UDP Listen port	3001	3001	Device B should listen for UDP traffic on this port number

¹ Device B is a multipoint GW DEVICE SERVER.... The UDP setting for each serial port should be the same.

4.1.5 Bidirectional multipoint-to-point settings in UDP mode

Example 4:

A weigh scale is connected to each of the GW DEVICE SERVER... ports and it sends data to a single monitoring PC (COM2). Each scale sends its data in sequence and no two scales send data at the same time. This is critical as there is no means by which data can be identified in relation to its sending port, and the data is intermingled. For example: Port 1 sends ABCD and Port 2 sends 1234, both at the same time. The data seen in COM2 may be A1B2CD34. Once data has been received from all four ports, the application needs to send an acknowledgment so that the scale can reset in preparation for the next measurement.

Table 4-5 Bidirectional multipoint-to-point settings in UDP

Parameter	GW DEVICE SERVER... (A)	GW DEVICE SERVER... (B) ¹	Explanation
Enable UDP connection	Enabled	Enabled	Use the UDP protocol
Enable serial to Ethernet	Enabled	Enabled	Forward serial data from device A to the Ethernet network
Enable Ethernet to serial	Enabled	Disabled	Ethernet traffic is forwarded to the serial port of device B
Allow Ethernet data from any IP address	Disabled	Disabled	Ignore UDP traffic from other devices in the network
Target IP address	Enter the IP address of device B	Enter the IP address of device A	Devices A and B send data to each other
Target port	3001 (serial port 1) 3002 (serial port 2) 3003 (serial port 3) 3004 (serial port 4)	3005	Devices A and B send data to each other
UDP Listen port	3005	3001 (serial port 1) 3002 (serial port 2) 3003 (serial port 3) 3004 (serial port 4)	Devices should listen for UDP traffic on these port numbers

¹ Device B is a multiport GW DEVICE SERVER....

4.2 Virtual COM port

Existing application software, which communicates only by way of serial COM interfaces, can be redirected to remote COM ports. To do this, virtual COM ports must be created on the PC, which the software can use for communication. The virtual COM ports are physically redirected to the network card and a destination IP in the network. There are two options for creating virtual COM ports: the COM Port Redirector software, or the GW DEVICE SERVER... Windows driver. Both can be downloaded from phoenixcontact.com.

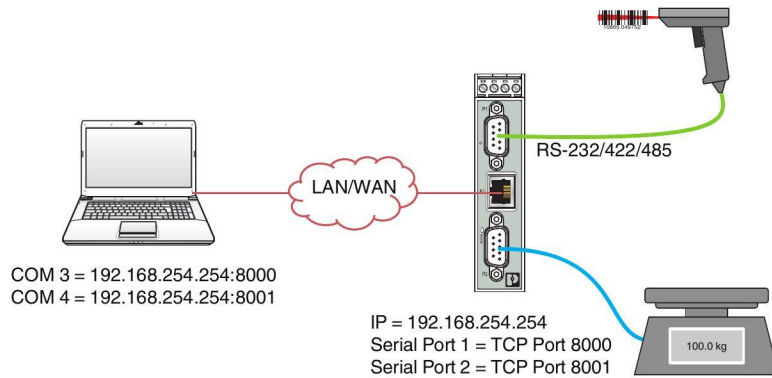


Figure 4-2 Virtual COM ports

4.2.1 COM port redirector software

The redirector application is a special peer-to-peer connection. It runs as an application on the PC and allows up to eight virtual COM ports to be set up.

4.2.1.1 Configure the GW DEVICE SERVER

Configure the TCP connection settings for the serial port in the following fashion.

Table 4-6 TCP connection settings

Parameter	GW DEVICE SERVER... (A)	Explanation
Enable TCP connection	Enabled	Use the TCP/IP protocol
Listen	Enabled	The COM port redirector initiates the connection
On Port	3001	Connect on TCP port 3001
Connect to IP address	–	The COM port redirector initiates the connection
Target port	–	
Source port	–	
Connect	Data	The connection is started when the COM port redirector sends data
Disconnect	Idle	If no data is received for the period set by the Idle Timer field, disconnect

4.2.1.2 Install the COM port redirector software

Download the COM port redirector software from phoenixcontact.com. Double-click the icon to start the installation process and follow the on-screen prompts.

4.2.1.3 Configure the COM port redirector software

1. Double-click the desktop icon to launch the software. Click “New Port” on the upper left.

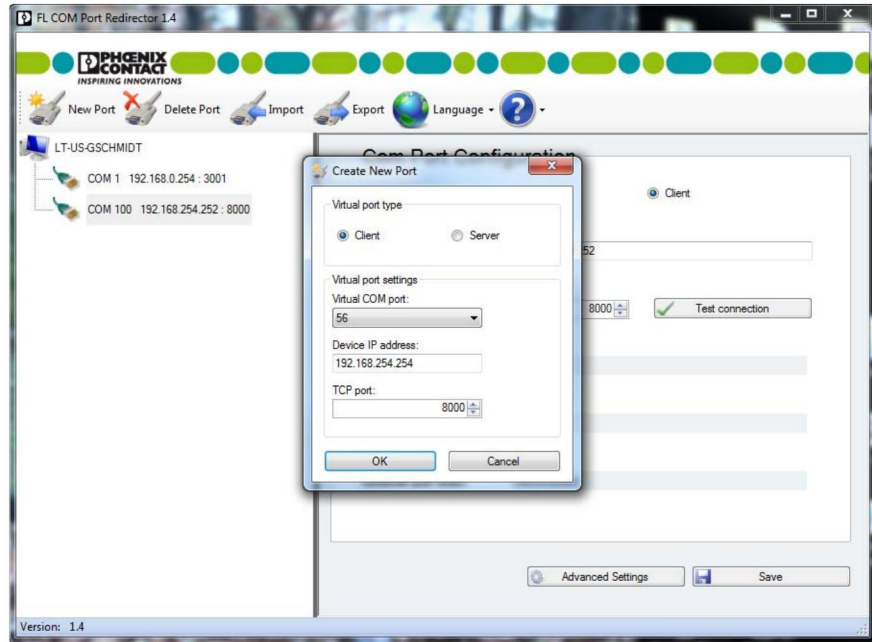


Figure 4-3 “Create New Port” dialog box

2. Click the “Client” button to select the virtual port type.
3. Enter a port number from the “Virtual COM port” drop-down menu.
4. Enter the IP address of the GW DEVICE SERVER... in the “Device IP address” field.
5. Enter **3001** in the “TCP port” field.
6. Click the “OK” button to close the dialog box.
7. Click “Test Connection” button to verify communication to the GW DEVICE SERVER...

4.2.2 Windows drivers

The GW DEVICE SERVER... Microsoft® Windows® driver (download at phoenixcontact.com and navigate to downloads), creates native COM ports on the host Windows operating system from the remote GW DEVICE SERVER... and is the recommended software for any timing-sensitive applications requiring true COM port communication and/or secure connections. It is supported on Windows 7/8/10 operating systems.

For further configuration information, refer to the GW DEVICE SERVER... Windows Driver manual.

5 Troubleshooting

5.1 Resetting the device

If, for some reason, the module needs to be reset to factory settings, there are two methods available: hardware reset and software reset.

5.1.1 Hardware reset

The reset button allows resetting the device without the use of a PC.

To force a hardware reset:

1. With the device powered off, press and hold the reset button. Apply power and hold the reset button for at least five seconds. Reinitializing the module and firmware reset may take some time. Do not disconnect from power (see Section 1.1, “Structure” for the location of the reset button on the GW DEVICE SERVER...).
2. After a successful reset, the module returns to the factory default address (192.168.254.254).

5.1.2 Software reset

To force a software reset:

1. Start the web server and navigate to the “Device Maintenance/Restore Defaults” page.
2. Click the check box on the page.
3. Click the “Apply Changes” button.
4. After a successful reset, the module returns to the factory default address (192.168.254.254).

5.2 LEDs

Table 5-1 LEDs

LED	Color	Meaning
STATUS	Green	The STATUS LED flashes while the device is booting (approximately 15 seconds). After booting, the LED blinks approximately every ten seconds. An internal error is indicated by three flashes every five seconds.
	Green	Link LED. On indicates Ethernet network is connected. ¹
	Yellow	Activity LED. Flashing indicates data transfer activity. ¹

¹ LEDs on Ethernet ports are not labeled. See Section 1.1, “Structure” for LED location.

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