# Special Documentation **S700**

Ethernet Interface Converter



#### **Described product**

Product name: S700 Ethernet Interface Converter

#### Manufacturer

Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27 01458 Ottendorf-Okrilla Germany

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# **1** About this document

This document describes handling the interface converter for control of the S700 via Ethernet.

## **1.1** Additional documentation / information

This document is a supplement to the Operating Instructions of the S700 product family.

These documents are available for download at www.endress.com/s700.

Furthermore, the Operating Instructions of the following component apply:

Component	Manufacturer
FL COMSERVER UNI 232/422/485	Phoenix Contact

# 2 Safety instructions

- This document is only complete in conjunction with the Operating Instructions of the corresponding analyzer. Read and observe the safety instructions and warnings contained therein.
- Do not put the device into operation until this document and the Operating I)nstructions have been read and understood. Contact Endress+Hauser customer service if you have any questions.
- The standards and directives of the Declaration of Conformity used are specified with the respective device.
- Keep this document together with the Operating Instructions for reference and pass it on to a new owner.

## 2.1 Intended use

The interface converter enables the use of Modbus TCP and remote control via MARC2000.

## 2.2 Qualification of the user

The device may only be operated by authorized persons who, based on their training on, and knowledge of the specific device, as well as knowledge of the relevant regulations can assess the tasks given and recognize the hazards involved.

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# **3** Product description

Two application cases can be realized using the "Interface converter Ethernet" option.

# 3.1 Application case 1 - Virtual serial interface

In this application case, the interface converter provides the serial interface of the S700 available to remote PCs via the network. An additional program which can be downloaded from PhoenixContact is required for use.

Once the connection has been established, the virtual serial port of the accessing PC can be used for the following tasks:

- Remote control of the device via Endress+Hauser "MARC2000" software
- After activating the Modbus ID in the S700: Communication with the device via Modbus RTU

With an existing Meeting Point Router (MPR) from Endress+Hauser, remote maintenance by Support is also possible without setting up a virtual port.

### **Functional principle**

A COM port redirector driver is installed on the PC, which provides a virtual COM port. The driver connects to the IP of the FL-COM server via the network connection when the virtual COM port is opened and sends the serial data to the FL-COM server via the network. The FL-COM Server "translates" the data received back to serial RS232 format and then uses the this serial connection to communicate with the S700.

The Figure below shows the setup with description.



1 PC with LAN connection

2 Virtual Com port (driver)

3 FL-COM-Server

4 S700 (Figure may differ)

Fig. 1: Application case - Virtual serial interface

# 3.2 Application case 2 - Modbus TCP gateway

In this application case, the interface converter is used to translate the Modbus RTU (serial) protocol to Modbus TCP Client (Ethernet) (gateway). This makes the S700 Modbus accessible for higher-level systems via Ethernet. In contrast to serial communication, it is also possible for several systems to access each other simultaneously.

The following tasks can be implemented:

• Integration of the S700 in Modbus TCP communication networks

## **Functional principle**

The interface converter is operated in "Modbus/TCP" operating mode. Port 502 is opened at the set IP address of the interface converter and the interface converter is then available as Modbus TCP server. The content of incoming Modbus TCP requests is extracted and the message forwarded to the device whose ID is contained in the telegram. The device's response is in turn transmitted back to the IP address of the requesting system.



- 1 PC with LAN connection
- 2 FL-COM-Server
- 3 S700 (Figure may differ)

Fig. 2: Application case - Modbus TCP gateway

# 4 Usage

# 4.1 Preparations

### Additional preparation for housing variants S710 / S711

- 1. Mount the COM server on the top-hat rail.
- 2. Connect the 24 V power supply to the terminal.
- 3. Connect the SIDOR/S700 to the serial interface with the standard cable (Part No.: 2135520).

### Preparations for all housing variants

4. Connect the converter with Ethernet cable directly to a PC for configuration.

# 4.2 Change the IP address

- 1. Change the IP address on the PC to 192.168.0.100.
- 2. Open the web browser to access the web interface and enter the IP address of the FL-COM-Server (Standard: 192.168.0.254).
- 3. Call up menu item "General configuration"-"IP".
- 4. Log in with password "private".
- 5. Change the setting according to the internal specifications.



IP Configuration - Au	utomatic Assignment			
Current discovered addresse	s			
IP Address Discovered	192.168.0.254			
Subnet Mask	255.255.255.0			
Default Gateway	0.0.0			
The IP address discovered in be configured in Static Mode	s not configurable. The Mask and Gateway may ).			
DNS				
DHCP Name				
IP Address Assignment				
Automatic Address Mode	Bootp I On I Off DHCP I On I Off			
Туре	O Static       Automatic			
The Automatic Address Mod last IP Address Discovered I	le Default is Bootp + DHCP. If no mode is set the is used.			
Confirm				
Note: You have to save and re	boot to activate the new configuration.			

Fig. 3: IP Configuration - Automatic assignment

PHENIX	FL COMSERVER UN	I			last u	pdate: 8:11:57
10000 	IP Configuration - Static Assignment					
	Current configured addresses					
- -	IP Address	192	. 168	. 178	. 67	
FL COMSERVER UNI 232/422/485	Subnet Mask	255	. 255	. 255	. 0	
	If Subnet Mask is 0.0.0.0 the standard netmask for class A, B, C is used.					
General Instructions	Default Gateway	0	. 0	. 0	. 0	
Device Information	If Default-Gateway is 0.0.0.0 no gateway is used.					
General Configuration	DNS	0	. 0	. 0	. 0	
<u>IP</u>	IP Address Assignment					
Serial	Туре		<ul> <li>Static</li> </ul>	2		O Automatic
SNMP						
Application	Confirm Note: You have to <u>save and reboot</u> to activate the new configuration.					
Security						
Software Update						
Configuration <u>Management</u>						
Save and Reboot						
Load Factory Settings						
Logout						

Fig. 4: IP Configuration - Static Assignment

## 4.3 Change the password

- 1. Navigate to "General Configuration" "Security"
- 2. Specify the current password to then assign a new password. The password for write access is "private" on delivery.



The password is transmitted over the network without encryption.

+1 If the password is not known, an emergency access via the serial interface is available. With the help of e.g. Hyperterminal, the device can be reset to the delivery state.

PHENIX	FL COMSERVER UNI		last update: 8:15:15
	Password Configura	tion	
	Change Read Password		
E.	Enter old password		
FL COMSERVER UNI	Enter new password		
23214221403	Retype new password		
General Instructions	Change Write Password		
Device Information	Enter old password		
General Configuration	Enter new password		
D IP	Retype new password		
Serial	The password must be at le password type in the old pa Warning: The password wil	east 4 and can be up t assword and leave the be sent over the net	o 8 characters. To clear the new password fields blank. vork unencrypted!
Application			
Security	WEB Manager Configuration	n	
Software Lindate	WEB Manager IP-Address	0.0.0	. 0
- Configuration	Security Flags		
Management	TFTP	<ul> <li>Enabled</li> </ul>	O Disabled
Save and Reboot		Confirm	
Load Factory Settings	Note: Once confirmed the Rea	ad and Write passwor	ds are activated
Logout	immediately but save and rel	boot to activate any W	EB Manager or Security
Eig. 5: Password Configuration	immediately but <u>save and rel</u>	boot to activate any W	EB Manager or Security

# 4.4 Settings for Application case 1 - Virtual serial interface

# 4.4.1 Setting

PHENIX	FL COMSERVE	RUNI	last update: 8:12:38
	Serial Configu	ration	
	Interface Type	Port 1 RS-232 ~	
81	Baud Rate	9600 ~	
FL COMSERVER UNI	Data Bits	8 ~	
232/422/485	Parity	none 🖂	
General Instructions	Stop Bits	1 ~	
Device Information	Flow Control	none ~	
General Configuration	RS-232 Interface Type	DTE	
D IP	Switching output	RESET V (Setting is NO	OT retained after a reboot)
Serial			
		Confirm	
Application	Note: You have to s	ave and reboot to activate th	ne new configuration.
Security	Typical settings:	3964 R, Phoenix Contact:	9600; 8; Even; 1; none
Software Update		S7-PC Adapter: S7-TS-Adapter:	19200; 8; Odd; 1; RTS/CTS 19200; 8; None: 1; RTS/CTS
Configuration Management		Modbus RTU: Modbus ASCII:	xxxx; 8; Even; 1; none xxxx; 7; Even; 1; none
Save and Reboot			
Load Factory Settings			
Logout			
Home			



- 1. Navigate to "General Configuration" "Serial"
- 2. Set the serial interface as shown in the Figure.

3. Confirm with "Confirm".

**+i** 



The configuration of the serial parameters must correspond to the

configuration set in the S700.

Fig. 7: Application Settings for TCP

- 4. Navigate to "General Configuration" "Application" (1).
- 5. Under "Protocol settings for TCP" (2), change the Operation Mode to TCP.
- 6. Confirm with "Confirm" (3).

The web interface is created dynamically depending on the Operation Mode. +i Therefore, it may be necessary to activate "Save" and "Reboot" (see Fig. 8) after changing the Operation Mode, so that the menu is displayed in (4).

7. After the restart, the corresponding operating mode "PC" for TCP is displayed in the lower field of the configuration (5).

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8. After complete configuration: Permanently save and activate the settings with the "Save and Reboot" routine. Enter the password to confirm the entry.

## 4.4.2 Set up the COM Port

 Download FL-COM-Port Redirector 1.50 from PhoenixContact and install it with administrator rights.
 R COM Port Redirector 1.50



Fig. 9: Creating the virtual COM-Port

- 2. After starting the FL COM-Port Redirector 1.50, create a new virtual COM-Port.
- 3. Set the mode to "Client" (see Fig. 9).

4. Select a free port number (for remote control with MARC2000, the port number must be in the range 1-6).

X

- 5. Enter the IP of the FL-COM-Server under "Device IP address".
- 6. Leave the TCP port at 3001.

#### 4.4.3 Set up the remote control with MARC2000

- 1. Download MARC2000 from www.endress.com/downloads and install.
- 2. Start MARC2000.
- 3. Navigate to "Options" "Interface Parameters"
- 4. Set the "COM-port" defined in Section "Set up the COM Port".

6	Schn	ittstel	len-l	Para	meter	ľ
---	------	---------	-------	------	-------	---

C 1200 C	2400 C 4800	Qk
@ 9600 C	19200 C 28800	Abbrechen
Datenbits	Stopbits	Echo C Ein @ Aus
Parität	COM-Anschluß	Protokoll
Keine	@ Com1	Kein     Kein
C Ungerade	C Com2	C Xon/Xoff
C Gerade	C Com3	C RTS/CTS
	C Com4	C Xon+RTS
	C Com5	0.000000000000
	C C C	

Fig. 10: Interface parameters

- 5. Navigate to "Run" "PC Control".
- 6. Create a connection.
- $\hspace{0.1 cm} \ggg \hspace{0.1 cm}$  Content is displayed in the black area.
- 7. The analyzer can now be operated via the virtual keypad.

|--|



Fig. 11: MARC2000 configuration

# 4.5 Settings for Application case 2 - Modbus Gateway

Serial Configuration         Interface Type       Port         Baud Rate       960         Data Bits       8 ~         Data Bits       8 ~         Device Information       Stop Bits       1 ~         Device Information       Flow Control       nom         General Configuration       Stop Bits       1 ~         Device Information       RS-232 Interface       DTE         Serial       Switching output       RES         Serial       SNMP       Application       Note: You have to save and I         Security.       Software Update       S7-TS-         Configuration       Modbus       Modbus	RS-232 v
FL COMSERVER UNI         232/422/485         General Instructions         Device Information         General Configuration         IP         Serial         SNMP         Application         Security,         Software Update         Configuration         Management	RS-232 ~
FL COMSERVER UNI 232/422/485       Baud Rate       9600         Data Bits       8 ~         Data Bits       8 ~         Parity       nom         Stop Bits       1 ~         Device Information       Stop Bits       1 ~         General Configuration       Flow Control       nom         IP       Switching output       RES         Serial       ShMP       Application       Note: You have to save and r         Security,       Software Update       S7-PC, S7-TS, Modbus       S7-PC, Modbus	T THE REPORT
FL COMSERVER UNI 232/422/485       Data Bits       8 ~         Parity       nom         General Instructions       Stop Bits       1 ~         Device Information       Flow Control       nom         General Configuration       RS-232 Interface Type       DTE         Secial       Switching output       RES         Security.       Note: You have to save and r         Software Update       S7-PC. S7-TS- Modbus         Configuration       Modbus         Modbus       Modbus	~
232/422/485       Parity       nom         General Instructions       Stop Bits       1 ~         Device Information       RS-232 Interface       DTE         General Configuration       RS-232 Interface       DTE         IP       Switching output       RES         Serial	
General Instructions       Stop Bits       1         Device Information       Flow Control       non         General Configuration       RS-232 Interface       DTE         IP       Switching output       RES         Serial	v
Device Information       Flow Control       nom         General Configuration       RS-232 Interface       DTE         IP       Switching output       RES         Serial       Switching output       RES         SNMP       Application       Note: You have to save and r         Security.       Typical settings:       3964 R         Software Update       S7-PC, S7-TS-, Modbus       Modbus         Modbus       Modbus       Modbus	
General Configuration       RS-232 Interface       DTE         IP       Switching output       RES         Serial       Switching output       RES         ShMP       Application       Note: You have to save and r         Security.       Typical settings:       3964 R         Software Update       S7-PC       S7-TS-         Modbus       Modbus       Modbus	×
IP     Switching output     RES       Serial	2
Serial         SNMP         Application         Note: You have to save and r         Security.         Typical settings:         3964 R         Software Update         Software Update         Modbus         Modbus         Modbus         Modbus	(Setting is NOT retained after a reboot)
SNMP     Note: You have to save and r       Application     Note: You have to save and r       Security     Typical settings: 3964 R       Software Update     S7-PC.       Configuration     Modbus       Management     Modbus	
Application         Note: You have to save and r           Security.         Typical settings: 3964 R           Software Update         S7-PC.           Configuration         Modbus           Management         Modbus	Confirm
Security.         Typical settings:         3964 R           Software Update         S7-PC           Configuration         Modbus           Management         Modbus	boot to activate the new configuration.
- Management Module	Phoenix Contact:         9600; 8; Even; 1; none           Japter:         19200; 8; Odd; 1; RTS/CTS           Japter:         19200; 8; None; 1; RTS/CTS           TU:         xxxx; 8; Even; 1; none
Save and Reboot Load Factory Settings	ASCII: xxxx; 7; Even; 1; none

Fig. 12: Serial Configuration

- 1. Navigate to "General Configuration" "Serial"
- 2. Set the serial interface as shown in the Figure.
- 3. Confirm with "Confirm".

+i

+i

The configuration of the serial parameters must correspond to the configuration set in the S700.

- 4. Navigate to "General Configuration" "Application"
- 5. Under "Protocol settings for TCP", change the Operation Mode to "MODBUS/TCP".
- 6. Confirm with "Confirm".



- 7. After the restart, the corresponding operating mode "PM" for "MODBUS/TCP" is displayed in the lower field of the configuration.
- 8. Under "Channel Settings" "Device Type", select the option "Slave".
- 9. Under "Protocol", select the "RTU" option.
- 10.Under "Slave Remote TCP", enter 502.
- 11.Confirm with "Confirm".
- 12.Use the link to switch to the "Save and Reboot" menu.

13.Confirm by entering the password and pressing "Confirm".

14.After the restart, the device can be accessed under the selected IP address on Port 502 for Modbus TCP requests.





## 4.6 Emergency configuration

If the possibility for a WBM device configuration via network is not available, e.g. because the set static IP address is unknown, it is possible to use the serial emergency access.

For this purpose, local access to the device and a PC with terminal program must be connected to the RS-232 interface.

## 4.6.1 Function scope

The following are available for emergency configuration:

- Configuration of the IP address / activation of the BootP mechanism
- Deleting all settings (incl. passwords) and resetting to factory settings
- Loading new firmware
- Complete device configuration by loading a file

#### 4.6.2 Procedure

- 1. Connect the FL COM SERVER UNI to a serial COM port of a PC.
- 2. Open a terminal program, e.g. Hyperterminal in the Windows start menu under "Programs" - "Accessories" - "Communication" - "Hyperterminal".
- 3. Configure the interface (e.g. COM 1) under "File" "Properties" to 9600 bit/s; No parity; 1 stop bit; No flow control.

Eigenschaften von COM1	? 🛛
Anschlusseinstellungen	
Bits pro Sekunde: 9600 💌	
Datenbits: 8	
Parität: Keine 🔽	
Stoppbits: 1	
Elusssteuerung: Kein 💌	
Wiederherstell	en
OK Abbrechen Obe	rnehmen

Fig. 13: Menu "Properties" in Windows hyperterminal

- 4. Confirm the settings with "OK" and close the menu.
- 5. Check the settings in the status bar of the hyperterminal.

 Verbunden 00:00:08
 Auto-Erkenn.
 9600 8-N-1
 RF
 GROSS
 NUM
 Aufzeichnen
 Druckerecho

 Fig. 14: Status bar in Windows hyperterminal

6. Perform a power reset on the FL COM SERVER UNI while holding down the X key on the keyboard.

7. As soon as a response from the FL COM SERVER UNI appears on the screen, press the Enter key within 3 seconds. The following Figure appears:

```
🏶 9600 8N1N - HyperTerminal
                                                                                                  Datei Bearbeiten Ansicht Anrufen Übertragung ?
0 🗃 👘 🗿 🖉 👘
                                                                                                          ~
  *** Phoenix FL Com Server. SET V2.0 ***
  Serial Number MAC address 00A04501BB28
Software version 01.8b5 (050525)
Press Enter to go into Setup Mode
  *** basic parameters
IP addr - 0.0.9.0/DHCP/B00TP, no gateway set, netmask 255.255.255.0
  DHCP device name : not set
                      : 0 Standard IP
  Change Setup
                         5 Security
7 Factory defaults
8 Exit without save
                       •
                       :
                       : 9 Save and exit
:10 Get Setup
:11 Put Setup
  Transfer
                                                                  Your choice ? 0_
                           Auto-Erkenn.
                                                                  NUM
Verbunden 00:20:13
                                         9600 8-N-1
```

Fig. 15: Serial setup menu

8. Select the desired option by entering the digit and confirm by pressing the Enter key.

8030738/AE00/V1-0/2023-04

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