ConneXium

TCSEFEC Industrial Firewall
Installation Manual

TCSEFEC23F3F20   TCSEFEC23FCF20   TCSEFEC2CF3F20

Schneider Electric

Contents

S1B64656 - 02/2012

About this Manual

Validity Note

The data and illustrations found in this book are not binding. We reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be construed as a commitment by Schneider Electric.

Product Related Information

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, please follow the relevant instructions.

Failure to use Schneider Electric software or approved software with our hardware products may result in improper operating results.

Failure to observe this product related warning can result in injury or equipment damage.

User Comments

We welcome your comments about this document. You can reach us by e-mail at techpub@schneider-electric.com

Related Documents

Title	Reference Number
ConneXium TCSEFEC Industrial Firewall Configuration User Manual	S1B64663
ConneXium TCSEFEC Industrial Firewall Command Line Interface Reference Manual	S1B64695
ConneXium TCSEFEC Industrial Firewall Web-based Interface Reference Manual	S1B64648
ConneXium TCSEFEC Industrial Firewall Installation User Manual	S1B64656

The "Configuration" user manual contains the information you need to start operating the Industrial Firewall TCSEFEC. It takes you step by step from the first startup operation through to the basic settings for operation in your environment.

The "Command Line Interface" Reference Manual contains detailed information on using the Command Line Interface to operate the individual functions of the device.

The "Web-based Interface" reference manual contains detailed information on using the Web interface to operate the individual functions of the device.

The "Installation" user manual contains a device description, safety instructions, a description of the display, and the other information that you need to install the device.

Key

The symbols used in this manual have the following meanings:

▶	Listing
☐	Work step
■	Subheading
	I/O - Robot

Safety instructions

■ Important Information

Notice: Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

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

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

PLEASE NOTE: Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

■ Usage
The device may only be employed for the purposes described in the catalog, technical description, and manuals.

■ Password security note
This device is a security product. For your own security, change the password during the first startup procedure.

■ Supply voltage
For safety reasons the devices have been designed to operate at low voltages. Thus, they may only be connected to the supply voltage connections and to the signal contact with SELV circuits with the voltage restrictions in accordance with IEC/EN 60950-1.

The supply voltage is electrically isolated from the housing.

☐ Relevant for North America:
The device may only be connected to a supply voltage of class 2 that fulfills the requirements of the National Electrical Code, Table 11(b). If the voltage is being supplied redundantly (two different voltage sources), the combined supply voltages must fulfill the requirements of the National Electrical Code, Table 11(b).

☐ Relevant for North America: For use in Class 2 circuits.
Only use copper wire/conductors of class 1, 140/167 °F (60/75 °C) or 167 °F (75 °C).

■ **Shielding ground**
The shielding ground of the connectable twisted pairs lines is connected to the front panel as a conductor.

■ **Housing**

⚠ **DANGER**
HAZARD OF ELECTRIC SHOCK
Never insert sharp objects (small screwdrivers, wires, etc.) into the inside of the product.
Failure to follow these instructions will result in death, serious injury, or equipment damage.

⚠ **CAUTION**
EQUIPMENT OVERHEATING
When installing the device, make sure any ventilation slots remain free. Maintain a clearance of at least 10 cm (3.94 in).
Failure to follow these instructions can result in injury or equipment damage.

Only technicians authorized by the manufacturer are permitted to open the housing.

The lower panel of the device is grounded by means of the DIN rail and optionally by means of the separate ground screw.

☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.

☐ The device must be installed in the vertical position .

☐ If installed in a living area or office environment, the device must be operated exclusively in switch cabinets with fire protection characteristics according to EN 60950-1.

■ Environment

The device may only be operated at the specified surrounding air temperature (temperature of the surrounding air at a distance of up to 5 cm (1.97 in) from the device) and relative air humidity specified in the technical data.

☐ Install the device in a location where the climatic threshold values specified in the technical data will be observed.

☐ Use the device only in an environment within the pollution degree specified in the technical data.

■ General safety instructions

Electricity is used to operate this equipment. Comply with every detail of the safety requirements specified in the operating instructions regarding the voltages to apply (see).

☐ Only appropriately qualified personnel should work on this device or in its vicinity. These personnel must be thoroughly familiar with the hazard messages and maintenance procedures in accordance with this operating manual.

☐ The proper and safe operation of this device depends on proper handling during transport, proper storage and assembly, and conscientious operation and maintenance procedures.

☐ Never start operation with damaged components.

☐ Only use the devices in accordance with this manual. In particular, observe the hazard messages and safety-related information.

☐ Any work that may be required on the electrical installation may only be carried out by personnel trained for this purpose.

Note: LED or LASER components in compliance with IEC 60825-1 (2007):
CLASS 1 LASER PRODUCT
CLASS 1 LED PRODUCT

Light is emitted from the optical connections or from the ends of the connected optical fibers that are connected to the optical connections. LIGHT EMITTING DIODE CLASS 2 M, wave length 650 nm, power <2 mW in accordance with DIN EN 60825-1:2003-10. LIGHT EMITTING DIODE CLASS 1 - CLASS 1 LED PRODUCT

⚠ WARNING

EYE DAMAGE DUE TO LASER LIGHT
Do not look into the beam or view the beam directly with optical instruments (magnifying glasses, microscope) at a distance of less than 100 mm (3.94 in).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

■ National and international safety regulations
　□ Make sure that the electrical installation meets local or nationally applicable safety regulations.

■ CE marking

The devices comply with the regulations contained in the following European directive(s):

2004/108/EC
Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electromagnetic compatibility.

In accordance with the above-named EU directive(s), the EU conformity declaration will be at the disposal of the relevant authorities at the following address:

Schneider Electric
35 rue Joseph Monier
CS30323
92506 Rueil-Malmaison-France

The product can be used in the industrial sector.

▶ Interference immunity: EN 61000-6-2:2005
▶ Emitted interference: EN 55022:2010

■ FCC note:

This device complies with part 15 of FCC rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference; (2) this device must accept any interference received, including interference that may cause undesired operation.
Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations.
These requirements are designed to provide sufficient protection against interference when the device is being used in a business environment. The device creates and uses high frequencies and can radiate same, and if it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a living area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

1   Device description

1.1   General device description

The industrial Firewall/VPN system
- ▶ TCSEFEC23F3F20
- ▶ TCSEFEC23FCF20
- ▶ TCSEFEC2CF3F20

subsequently referred to as TCSEFEC, helps provide for the authentication, security and confidentiality of communication within production networks, and also beyond company boundaries.

The TCSEFEC has the following interfaces:
- ▶ depending on the type, up to two 10/100 Mbit/s twisted pair (TP/TX) ports (RJ45 socket) and/or
- ▶ depending on the type, up to one 100 Mbit/s FX port (multimode) with DSC connection and
- ▶ additionally a V.24 input for external management or a modem connection and
- ▶ a USB interface.

The TCSEFEC supports the following network modes:
- ▶ Transparent Mode
- ▶ Router Mode
- ▶ PPPoE Mode

The Industrial Firewall is used everywhere that security-sensitive network cells require a connection from the internal network into an external network. The Industrial Firewall is the link between the internal network and the external network from which unauthorized accesses are to be expected. In its function as a link, the Industrial Firewall helps protect the internal network from undesired data traffic along the connection to the external network.

Typical uses are:

- ▶ Helping protect individual production cells in a flat company network
- ▶ Helping protect individual production cells in a routed company network
- ▶ Coupling identical production cells to a company network
- ▶ Connecting a production cell with the office network via a public network
- ▶ Helping provide protected service access
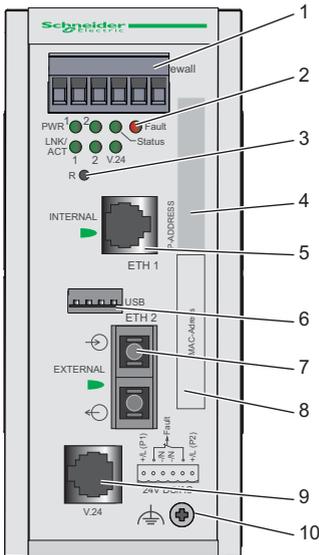- ▶ Separation of machine common parts

Figure 1: *Overview of interfaces, display and operating elements on the TCSEFEC*
1 - 6-pin terminal block, pluggable
2 - LED display elements
3 - Reset button
4 - IP address field
5 - Port 1: Depending on device model,
TX (RJ45 connector) and/or FX (DSC connector)
6 - USB connection
7 - Port 2: Depending on device model,
TX (RJ45 connector) and/or FX (DSC connector)
8 - MAC address field
9 - V.24 interface: external management and modem
10 - Grounding screw

The devices are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide high operational reliability, even under extreme conditions, and also long-term reliability and flexibility. The devices operate without fans and have a redundant voltage supply. The devices are quickly mounted by snapping them onto a DIN rail, which also automatically contacts the function ground.

The devices provide you with the following features:
▶ Firewall (FW)
▶ Virtual Private Network (VPN) functions
▶ ARP Limiter
▶ Redundancy support
▶ TCSEAM0100 adapter support

- ▶ Management: HTTPS, SNMPv1, SNMPv2, SNMPv3, SSH, V.24
- ▶ Redundant power supply
- ▶ Temperature range: +32 °F to +140 °F (0 °C to +60 °C), without fan
- ▶ Housing: mountable on DIN rail, IP20

1.2   Device versions

Part Number	Part Number	Description
2 Port Version	TCSEFEC23F3F20	2 10/100 TX Managed
	TCSEFEC23FCF20	1 10/100 TX Managed, 1 100 FX-MM Managed
	TCSEFEC2CF3F20	1 100 FX-MM Managed, 1 10/100 TX Managed
Accessories	TCSEAM0100-Adapter	Memory Back-up Adapter
	490NTRJ11-Cable	Terminal cable

1.3   Description of the device variants

These devices can be managed. They have the following properties:

- ▶ Voltage range: 12 to 48 V DC or 24 V AC
- ▶ Temperature range: +32 °F to +140 °F (0 °C to +60 °C)

The device conforms to the specifications of standard

- ▶ ISO/IEC 8802-3u 100BASE-TX
- ▶ ISO/IEC 8802-3 100BASE-FX

The device contains the function units, such as: Firewall/VPN function, Management function, voltage connection, management connection (V.24), operation element (reset button).

■ Interfaces

Device	Port 1 (internal)		Port 2 (external)	
	TX	**MM**	**TX**	**MM**
TCSEFEC23F3F20	X	—	X	—
TCSEFEC23FCF20	X	—	—	X
TCSEFEC2CF3F20	—	X	X	—

Table 1: Interfaces of the TCSEFEC types
TX = Twisted pair 100BASE-TX
MM = F/O multimode 100BASE-FX

1.3.1   Device variants with 2 TX ports
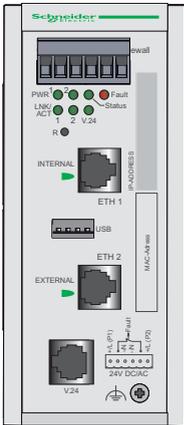
Figure 2:   Interfaces of the TCSEFEC23F3F20
1- Port 1 (internal port): 100BASE-TX, RJ45 connector,
Autonegotiaton, autopolarity, autocrossing
2 - Port 2 (external port): 100BASE-TX, RJ45 connector,
Autonegotiaton, autopolarity, autocrossing

1.3.2 Device variants with 1 TX port and 1 FX port
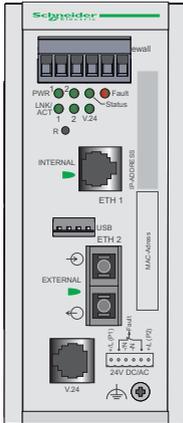
Figure 3: Interfaces of the TCSEFEC23FCF20
1 - Port 1 (internal port): 100BASE-TX, RJ45 connector, Autonegotiaton, autopolarity, autocrossing
2 - Port 2 (external port): 100BASE-FX, DSC connector, Multimode

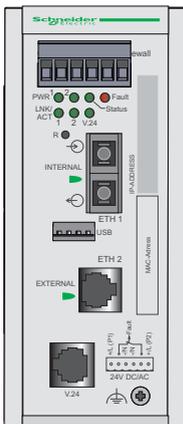### 1.3.3 Device variants with 1 FX port and 1 TX port

Figure 4: Interfaces of the TCSEFEC2CF3F20
1 - Port 1 (internal port): 100BASE-FX, DSC connector, Multimode
2 - Port 2 (external port): 100BASE-TX, RJ45 connector, Autonegotiaton, autopolarity, autocrossing

2 Assembly and start-up

2.1 Safety instructions

■ **Staff qualification requirements**

Only appropriately qualified staff should work on or near this equipment. Such staff must be thoroughly acquainted with all the hazard messages and maintenance measures contained in these operating instructions. The proper and safe operation of this equipment assumes proper transport, appropriate storage and assembly, and careful operation and maintenance.

Qualified staff are persons familiar with setting up, assembling, installation, starting up, and operating this product, and who have appropriate qualifications to cover their activities, such as:

▶ knowledge of how to switch circuits and equipment/systems on and off, ground them, and identify them in accordance with current safety standards

▶ training or instruction in accordance with current safety standards of using and maintaining appropriate safety equipment

▶ first aid training

■ **Recycling note**

After usage, this product must be disposed of properly as electronic waste, in accordance with the current disposal regulations of your county, state and country.

2.2 Installing the device

Before installing and starting up the device, note the safety instructions (see onwards).

2.2.1 Overview of installation

Two or more devices configured with the same IP address can cause unpredictable operation of your network.

⚠ **WARNING**
UNINTENDED EQUIPMENT OPERATION
Establish and maintain a process for assigning unique IP addresses to all devices on the network.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

The devices have been developed for practical application in a harsh industrial environment.

On delivery, the device is ready for operation.
The following steps should be performed to install and configure a ConneXium Industrial Firewall product:

▶ Unpacking and checking
▶ Connect the terminal block for voltage supply and signal contact and connect the supply voltage
▶ Install the terminal block, start-up procedure
▶ Install the device on the DIN rail, grounding
▶ Connect the data lines

2.2.2 Unpacking and checking

☐ Check that the contents of the package are complete (see page 31 "Scope of delivery").
☐ Check the individual parts for transport damage.

2.2.3 Terminal block for supply voltage and signal contact

The supply voltage and the signal contact are connected via a 6-pin terminal block with a snap lock.

■ Supply voltage

⚠ DANGER

HAZARD OF ELECTRIC SHOCK OR BURN

When the module is operated with direct plug-in power units, use only:
– SELV supply units that comply with IEC 60950/EN 60950 and
– (in USA and Canada) Class 2 power units that comply with applicable
  national or regional electrical codes

Connect the ground wire to the PE terminal (where applicable) before you
establish any further connections. When you remove connections,
disconnect the ground wire last.

**Failure to follow these instructions will result in death, serious injury,
or equipment damage**.

Redundant power supplies can be used. Both inputs are uncoupled.
There is no distributed load. With redundant supply, the power supply unit
supplies the device only with the higher output voltage. The supply
voltage is electrically isolated from the housing.

You can choose between DC or AC voltage when connecting the supply
voltage (fig. 5).

Note: With non-redundant supply of the main voltage, the device reports
a loss of power. You can avert this message by applying the supply
voltage via both inputs, or by changing the configuration in the
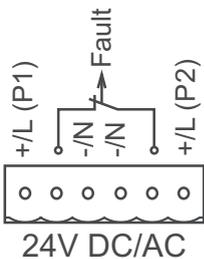Management.

Figure 5: Pin assignment of the 6-pin terminal block

■ **Signal contacts**
  ▶ The signal contact ("FAULT", for pin assignment see) is used for the remote monitoring of the device to enable remote diagnostics. You can specify the type of function monitoring in the Management.
  ▶ You can also use the Management to set the signal contact manually and thus control external devices.

A break in contact is used to report the following conditions via the potential-free signal contact (relay contact, closed circuit):

  ▶ The detected inoperability of at least one of the two voltage supplies (voltage supply 1 or 2 is below the threshold value).
  ▶ A continuous detected error in the device (internal supply voltage).
  ▶ The detected error of the link status of at least one port. The report of the link status can be masked by the Management for each port. In the default state, link status monitoring is deactivated.
  ▶ The temperature of the device is outside the range specified in the threshold values.
  ▶ The removal of the TCSEAM0100 adapter.

A break in contact is used to report the following via the potential-free signal contact (relay contact, closed circuit):
  ▶ a continuous detected error in the device (internal supply voltage)

2.2.4 Connecting the terminal block, start-up procedure

☐ Pull the terminal block off the device and connect the voltage supply lines and the signal lines.

■ **Startup procedure**
  ☐ Mount the terminal block for the voltage supply and signal contact on the front of the device by snapping the lock into place.

Connecting the voltage supply via the terminal block starts the operation of the device.

2.2.5 Installing the device on the DIN rail, grounding

☐ Mount the device on a 35 mm DIN rail in accordance with DIN EN 60175.
☐ Attach the upper snap-in guide of the device into the DIN rail and press it down against the DIN rail until it snaps into place.

Note: The shielding ground of the industrial connectable twisted pair lines is connected to the lower panel as a conductor.
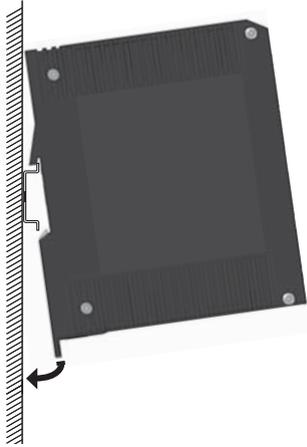
Figure 6:   Mounting on the DIN rail

■ **Grounding**
The lower panel of the device housing is grounded by means of the DIN rail and optionally by means of the separate ground screw. (see fig. 1).

2.2.6   Connecting the data lines

■ **10/100 Mbit/s twisted pair connection**
These connections are RJ45 sockets.
10/100 Mbit/s TP ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 10BASE-T/ 100BASE-TX standard.
These ports support:
▶ Autonegotiation
▶ Autopolarity
▶ Autocrossing (if autonegotiation is activated)
▶ 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
▶ 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode
State on delivery: autonegotiation activated.

The socket housing is electrically connected to the bottom panel.

Figure	Pin	Function
	1+2	One line pair: receiver path
	3+6	One line pair: sender path
	4,5,7,8	Not used

Table 2:   Pin assignment of a TP/TX interface in MDI-X mode, RJ45 socket

■ 100 Mbit/s F/O connection

These connections are DSC connectors.

100 MBit/s F/O ports enable the connection of terminal devices or independent network segments in compliance with the IEEE 802.3 100BASE-FX standard.

These ports support:

▶ Full or half duplex mode

State on delivery: full duplex FDX

Note: LED or LASER components in compliance with IEC 60825-1 (2007):
CLASS 1 LASER PRODUCT
CLASS 1 LED PRODUCT

Light is emitted from the optical connections or from the ends of the connected optical fibers that are connected to the optical connections.
LIGHT EMITTING DIODE CLASS 2 M, wave length 650 nm, power <2 mW in accordance with DIN EN 60825-1:2003-10.
LIGHT EMITTING DIODE CLASS 1 - CLASS 1 LED PRODUCT

⚠ WARNING

EYE DAMAGE DUE TO LASER LIGHT
Do not look into the beam or view the beam directly with optical instruments (magnifying glasses, microscope) at a distance of less than 100 mm (3.94 in).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

2.2.7 Connection to the network

☐ Connect the device via the INTERNAL port to the internal network or the local computer that you want to help protect.
☐ Connect the device via the EXTERNAL port to the external network, e.g. the Internet. This network is used to set up the connections to the external device or external network.

2.3 Display elements

After the operating voltage is applied, the software starts and initializes itself. Afterwards, the device performs a self-test. During these actions, the STATUS LED flashes. The process takes around 40 seconds.
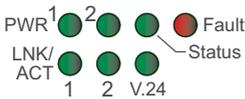
■ Device state

These LEDs provide information about conditions which affect the operation of the whole device.

PWR1 - Power 1 (green LED)	
Glowing green	Supply voltage 1 is present
Not glowing	Supply voltage 1 is too low
PWR2 - Power 2 (green LED)	
Glowing green	Supply voltage 2 is present
Not glowing	Supply voltage 2 is too low
FAULT - detected error, signal contact (red LED) [a]	
Glowing red	The signal contact is open, i.e. it is reporting a detected error.
Not glowing	The signal contact is closed, i.e. it is not reporting a detected error.

a. If the manual adjustment is active on the "FAULT" signal contact, then the detected error display is independent of the setting of the signal contact.

STATUS (green/yellow LED)	
Flashing green	Initialization phase of the device.
Glowing green	Device is ready for operation.
Slowly flashing yellow	The device is in Router Redundancy Backup Mode.
Glowing yellow	The device is operating in the Router Redundancy Master Mode and there is no communication with the backup device
Flashing alternately green and yellow (1 change per second)	The VPN status indication is switched on and at least 1 VPN connection is active. The flashing of the STATUS LED as an indication of EAM loading or EAM saving operations takes precedence over the flashing as an indication of VPN connections.

STATUS and V.24 - saving processes of the Memory Backup Adapter (EAM)	
Flashing alternately	Detected error during saving process.
LEDs flash synchronously, two times a second	Loading configuration from the EAM.
LEDs flash synchronously, once a second	Saving the configuration in the EAM.

■ Port state

These LEDs display port-related information.

LNK/ACT, V.24 - data, link status (green/yellow LEDs)	Meaning
Not glowing	No valid connection.
Glowing green	Valid connection.
Flashing green (3 times a period)	Port is switched off.
Flashing yellow	Data reception.

2.4   Controls

The TCSEFEC has a Reset button (see fig. 1).

■ Reset button R (restart)

The reset button is used to restart the device.

☐ To perform the restart, press the reset button for longer than 1.5 seconds until the STATUS LED goes dark and the FAULT LED lights up red.

Note: The system monitor is used to flash the software. You will find a more detailed description of how to perform this action in the "Configuration" user manual of the TCSEFEC.

2.5   Basic set-up

Enter the IP parameters when you install the device for the first time. The device provides multiple options for configuring IP addresses:
▶ Entry via V.24 connection
▶ Entry via the Ethernet Switch Configurator protocol via the application Ethernet Switch Configurator

► Memory Backup Adapter
► Web Interface

Further information on the basic settings of the device can be found in the "Configuration" user manual.

■ Default settings
► IP address: DHCP default setting off
► Management password:
  user, password: public (read only)
  admin, password: private (read and write)
► V.24 data rate: 9,600 Baud
► Ethernet ports: link status is not evaluated (signal contact)
► Optical 100 Mbit/s ports: 100 Mbit/s full duplex
  Other ports: autonegotiation

■ USB interface
The USB socket has an interface for the local connection of an Memory Backup Adapter TCSEAM0100 or another approved USB storage device. It is used for saving and loading the configuration and for updating the software.

Contact number	Signal name
1	VCC
2	- Data
3	+ Data
4	Ground

■ V.24 interface (external management)
A serial interface is provided on the RJ11 socket (V.24 interface) for the local connection of an external management station (VT100 terminal or PC with corresponding terminal emulation). This enables you to set up a connection to the Command Line Interface (CLI) and to the system monitor.

VT 100 terminal settings	
Speed	9,600 Baud
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

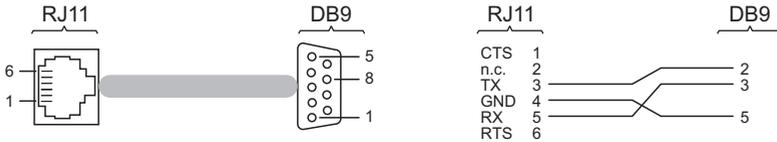The socket housing is electrically connected to the housing of the device.

Figure 7: Pin assignment of the V.24 interface and the DB9 connector

Note: You will find the order number for the terminal cable, which is ordered separately, in the Technical Data chapter .

2.6   Configuration

2.6.1   Firewall and VPN functions

■ **Firewall functions**
The TCSEFEC supports the following firewall functions:

▶ Stateful Inspection Firewall

▶ Transparent Firewall

▶ Configurable Firewall rules:
    ▶ Incoming/outgoing data traffic
    ▶ Modem access
    ▶ External Management access

▶ IP Masquerading, 1-to-1 NAT, Port Forwarding

▶ IP Spoofing Protection

■ **VPN functions**
The TCSEFEC supports the following Virtual Private Network (VPN) functions:

▶ Multipoint VPN: Router Mode

▶ VPN protocols: IPsec

▶ Encryption algorithms:
    ▶ DES-56
    ▶ 3DES-168
    ▶ AES-128, AES-192, AES-256

▶ Authentication:
  ▶ Pre-shared key (PSK)
  ▶ X.509v3 certificates

▶ Hashing algorithms: MD5, SHA-1

▶ NAT-T support

2.6.2 Operating modes

This device helps protect the internal network from the influences of the external network. These influences can include unauthorized access attempts, as well as interfering network events such as overloads.

■ State on delivery

On delivery, the device works in the Transparent Mode. In this mode, no network settings (e.g., for subnetworks) are required for operation.

The firewall has been preconfigured so that the IP data traffic from the internal network is possible; however, traffic from the external network to the internal network is not possible. Thus, already the delivery state helps protect against unauthorized accesses from the external network.

■ Transparent Mode

The Transparent Mode is a transparent bridge mode. In this mode, the device works as a 2-port bridge, whereby only IP and ARP frames corresponding to the firewall rules are transmitted.

In the state on delivery, you can access the device via address 192.168.1.1/24 without configuring the IP address.

■ Router Mode

In Router Mode, the device works as a 2-port router. You will find a detailed description of the IP configuration in the "Configuration" user manual of the TCSEFEC.

Note: In the Router and Transparent modes, an additional network access option to the internal network is provided over the V.24 interface of the TCSEFEC, via PPP. In this case, communication is possible with the TCSEFEC itself or with the devices in the internal network (according to the firewall rules for the modem connection).

■ PPPoE Mode

In PPPoE Mode, the TCSEFEC works like in the router mode, with the difference that the PPPoE protocol is used at the external port. This enables Internet connections via a DSL modem, for example.

2.6.3 Start configuration

To access the TCSEFEC, you proceed as follows (device in state on delivery):

☐ Install the required Java plug-in on your computer.
You will find information about the plug-in and its installation in the Configuration user manual.

☐ Start an https-capable Web browser on the computer connected to the internal port (e.g. Mozilla Firefox from version 1.5 on, or Microsoft Internet Explorer from version 6 on) in order to configure the TCSEFEC.

☐ Connect the external port to your network.

☐ Enter the following address in the Web browser:
https://192.168.1.1/

Result: The HTTPS connection to the TCSEFEC is set up. A security message is displayed.

☐ Confirm the security message with "Yes".

☐ To login, enter:
– Login: admin
– Password: private
(case-sensitive!)

Result: The Administrator website of the TCSEFEC is displayed.

☐ Configure the device in accordance with the Configuration user manual.

Alternatively, you can perform the IP configuration for the Transparent Mode using the Ethernet Switch Configurator protocol. You will find the Ethernet Switch Configurator software in the CD ROM included in the delivery.

Note: If the configuration connection to the TCSEFEC is not set up, you will find detailed information in the "Configuration User Manual - Industrial Firewall TCSEFEC".
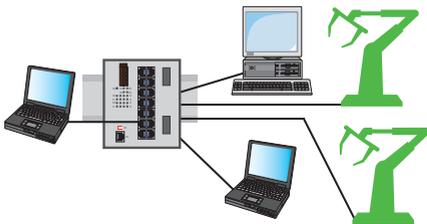

Figure 8:   Configuration before the installation of the TCSEFEC
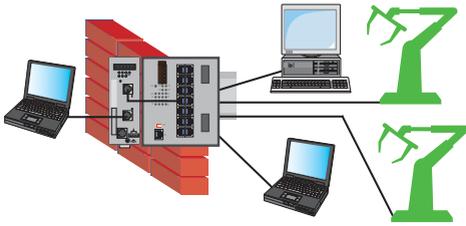
Figure 9: Configuration after the installation of the TCSEFEC

2.7   Maintenance

Depending on the degree of pollution in the operating environment, check at regular intervals that the ventilation slots in the device are not obstructed. Operate this device according to the specifications (see "Technical data").

2.8   Disassembly

■ Removing the device from the DIN rail
   □ In order to remove the device from the DIN rail, insert the screwdriver horizontally under the chassis in the locking slide, pull this down – without tilting the screwdriver – and lift the device upwards.

Figure 10: Removing the device from the DIN rail

3 Technical data

◾ General technical data

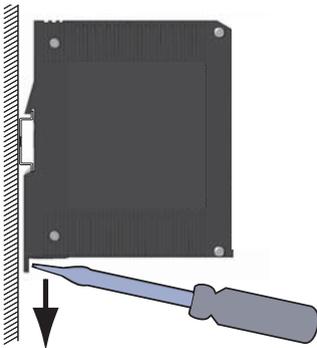|		
Dimensions W × H × D	TCSEFEC...	2.36 in. × 5.71 in. × 4.92 in. (60 mm × 145 mm × 125 mm)
Weight	TCSEFEC...	21.16 oz - 22.22 oz (depending on variant) (600 g - 630 g)
Power supply	Redundant power supply	
	Safety extra-low voltage (SELV), redundant inputs disconnected.	
	Relevant for North America: NEC Class 2 power source max. 5A.	
	Operating voltage	Rated voltage range DC 12 to 48 V DC
		Max. voltage range DC min. 9.6 to max. 60 V DC
		Rated voltage range AC 24 V AC
		Max. voltage range AC min. 18 to max. 30 V AC
Overload current protection at input	Non-replaceable fuse	
Insulation voltage between operating voltage connections and housing		800 V DC Protective elements limit the insulation voltage to 90 V DC (1mA)
"FAULT" signal contact	Switching current	max. 1 A, SELV
	Switching voltage	max. 60 V DC or max. 30 V AC, SELV Relevant for North America: NEC Class 2
Environment	Storage temperature (ambient air)	−40 °F ... +158 °F (−40 °C ... +70 °C)
	Humidity	10% ... 95% (non-condensing)
	Air pressure	Up to 2000 m (795 hPa), higher altitudes on request
Operating temperature	Surrounding air	+32 °F ... +140 °F (0 °C ... +60 °C)
Protection classes	Laser protection	Class 1 according to EN 60825-1 (2007)
	Protection class	IP 20
Mounting	35 mm DIN rail (DIN EN 60175)	
Pollution degree		2

◾ EMC and immunity

EMC interference immunity		
EN 61000-4-2	Electrostatic discharge Contact discharge Air discharge	4 kV 8 KV
EN 61000-4-3	Electromagnetic field 80 - 2,700 MHz	10 V/m

EMC interference immunity		
EN 61000-4-4	Fast transients (burst) - Power line - Data line	 2 kV 1 kV
EN 61000-4-5	Voltage surges - Power line, line/line - Power line, line/earth - Data line	 0.5 kV 1 kV 1 kV
EN 61000-4-6	Line-conducted interference voltages 150 kHz - 80 MHz	 10 V
EN 61000-4-9	Impulse-shaped magnetic fields	-
EMC emitted interference		
EN 55022	Class A	Yes
FCC 47 CFR Part 15	Class A	Yes
Germanischer Lloyd	Classification and Construction Guidelines VI-7-3 Part 1	-
Stability		
Vibration	IEC 60068-2-6 Test FC test level according to IEC 61131-2	Yes
	Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1	-
	IEC 870-2-2 table 3 normal, requirements according to EN61850-3	-
	EN 61373, Category 1, Class A (broadband noise), requirements according to EN 50155	-
Shock	IEC 60068-2-27 Test Ea test level according to IEC 61131-2	Yes
	IEC 870-2-2 table 3 normal, requirements according to EN61850-3	-
	EN 61373, Category 1, Class A requirements according to EN 50155	-

■ Network range

TP port	
Length of a twisted pair segment	max. 100 m

Table 3: TP port 10BASE-T / 100BASE-TX

Ports	Wave length	Fiber	System attenuation	Extent[a]	Fiber attenuation	BLP/ dispersion
MM	1300 nm	50/125 µm	0-8 dB	0-5 km	1.0 dB/km	800 MHz*km
MM	1300 nm	62.5/125 µm	0-11 dB	0-4 km	1.0 dB/km	500 MHz*km

Table 4: LWL port 100BASE-FX

a. including 3 dB system reserve when compliance with the fiber data is observed

MM = Multimode

■ Power consumption/power output

Device variant	Power consumption at 24 V DC	Power output at 24 V DC	Power consumption at 24 V AC	Power output at 24 V AC
...TX/TX	6.9 W	23.5 Btu (IT)/h	7.2 W	24.6 Btu (IT)/h
...TX/MM ...MM/TX	8.1 W	27.6 Btu (IT)/h	8.1 W	27.6 Btu (IT)/h

■ Interfaces

TCSEFEC ...	V.24 port: external management, modem terminal block, 6-pin: signal contact, max. 1 A, 24 V and voltage supply USB interface: TCSEAM0100-Adapter
Additionally 2 type-dependent ports each	Up to two 10/100 Mbit/s twisted pair (TP/TX) ports with RJ45 sockets and/or one 100 Mbit/s FX port (multimode) with DSC connection

■ Scope of delivery

TCSEFEC device		
Terminal block	6-pin	
	Connection	Power supply
		Signal contact
CD ROM with Installation manual		

■ Order numbers/product description

Part Number	Part Number	Description
2 Port Version	TCSEFEC23F3F20	2 10/100 TX Managed
	TCSEFEC23FCF20	1 10/100 TX Managed, 1 100 FX-MM Managed
	TCSEFEC2CF3F20	1 100 FX-MM Managed, 1 10/100 TX Managed
Accessories	TCSEAM0100-Adapter	Memory Back-up Adapter
	490NTRJ11-Cable	Terminal cable

■ Underlying norms and standards

Name	
EN 61000-6-2:2005	Generic norm – immunity in industrial environments
EN 55022:2010	IT equipment – radio interference characteristics
EN 60950-1:2006 + A11:2009 + A1:2010	Safety for the installation of IT equipment
EN 61131-2:2008	Programmable logic controllers
EN 50121-4:2000	Railway applications - EMC - emitted interference and interference immunity for signal and telecommunication systems
FCC 47 CFR Part 15:2009	Code of Federal Regulations
German Lloyd	Classification and Construction Guidelines VI-7-3 Part 1 Ed.2003
cUL 508:1998	Safety for Industrial Control Equipment
EN 60079-15	Electrical equipment for explosive gas atmospheres – part 15: Construction, testing and marking of protection type "n" electrical apparatus.
EN 50155	Declaration (Railways)
IEC/EN 61850-3	Communications networks and systems in stations
IEEE 1613	Standard Environment and Testing Requirements for Communication Networking Devices in Electric Power Substations

Table 5:   List of norms and standards

IEEE 802.1AB	Topology Discovery (LLDP)
IEEE 802.3-2002	Ethernet
IEEE 802.3ac	VLAN Tagging

Table 6: List of IEEE norms

The device has a certification based on a specific standard only if the certification indicator appears on the housing.