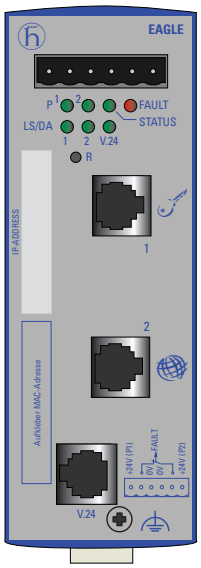
Description and operating instructions
Industrial ETHERNET Firewall/VPN System

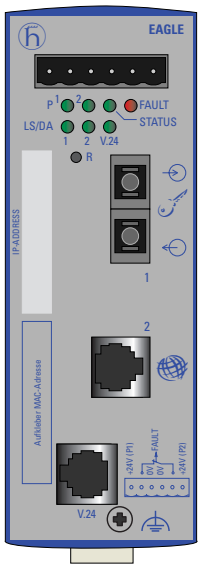
EAGLE

Bestell-Nr. / Order No.

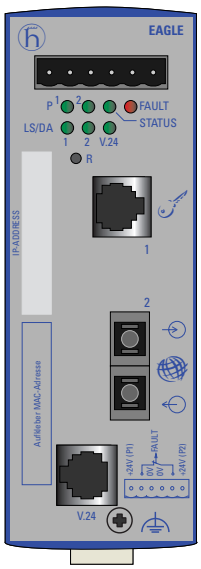
943 011-00x
943 011-01x (FW…)



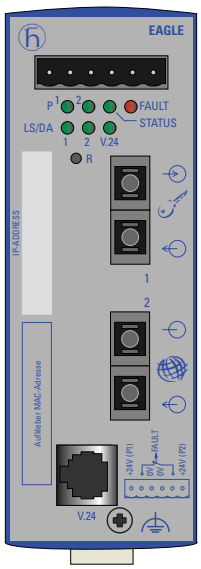
EAGLE TX/TX
EAGLE FW TX/TX



EAGLE MM SC/TX
EAGLE FW MM SC/TX



EAGLE TX/MM SC
EAGLE TX/SM SC
EAGLE TX/LH SC
EAGLE FW TX/MM SC
EAGLE FW TX/SM SC
EAGLE FW TX/LH SC



EAGLE MM SC/MM SC
EAGLE MM SC/SM SC
EAGLE MM SC/LH SC
EAGLE FW MM SC/MM SC
EAGLE FW MM SC/SM SC
EAGLE FW MM SC/LH SC

The industrial firewall/VPN system

– EAGLE TX/TX
– EAGLE TX/MM SC
– EAGLE TX/SM SC
– EAGLE TX/LH SC
– EAGLE MM SC/TX
– EAGLE MM SC/MM SC
– EAGLE MM SC/SM SC
– EAGLE MM SC/LH SC

– EAGLE FW TX/TX
– EAGLE FW TX/MM SC
– EAGLE FW TX/SM SC
– EAGLE FW TX/LH SC
– EAGLE FW MM SC/TX
– EAGLE FW MM SC/MM SC
– EAGLE FW MM SC/SM SC
– EAGLE FW MM SC/LH SC

in the following called EAGLE, authenticates, validates and ensures that the communication within the production networks remains confidential, also beyond the boundaries of the company.

– Interfaces:
  depending on the type up to two 10/100 MBit/s twisted pair (TP/TX) ports (RJ45 socket) and/or up to two 100 MBit/s FX ports (multimode, singlemode or longhaul) with DSC connectors and additionally one V.24 interface for external management or modem connection

– Network modes:
  • Multi Client Transparent Mode (MCT Mode), default setting
  • Single Client Transparent Mode (SCT Mode)
  • Router Mode
– Firewall (FW)
– ARP Limiter
– Redundancy support
– ACA 11 support
– Management: HTTPS, SNMPv3, SSH
– Redundant 24 V power supply
– Temperature range: 0°C – 60°C, no fan
– Housing: can be mounted on DIN rail, IP20

The VPN versions (EAGLE TX…/ EAGLE MM…) in addition support Virtual Private Network (VPN) functions.

In the „Manual EAGLE Management – Industrial ETHERNET Firewall/VPN System“ you will find a detailed description on the EAGLE.

The performance features described here are binding only if they have been expressly guaranteed in the contract. We have checked that the contents of the technical publication agree with the hardware and software described. However, it is not possible to rule out deviations completely, so we are unable to guarantee complete agreement. However, the details in the technical publication are checked regularly. Any corrections which prove necessary are contained in subsequent editions. We are grateful for suggestions for improvement.

We reserve the right to make technical modifications.

Note

We would point out that the content of these operating instructions is not part of, nor is it intended to amend an earlier or existing agreement, permit or legal relationship. All obligations on Hirschmann arise from the respective purchasing agreement which also contains the full warranty conditions which have sole applicability. These contractual warranty conditions are neither extended nor restricted by comments in these operating instructions.

We would furthermore point out that for reasons of simplicity, these operating instructions cannot describe every conceivable problem associated with the use of this equipment. Should you require further information or should particular problems occur which are not treated in sufficient detail in the operating instructions, you can request the necessary information from your local Hirschmann sales partner or directly from the Hirschmann office (address: refer to chapter entitled „Notes on CE identification“).

Safety Instructions

This manual contains instructions which must be observed to ensure your own personal safety and to avoid
damage to devices and machinery. The instructions are highlighted with a warning triangle and are shown as
follows according to the degree of endangerment:

Danger!
means that death, serious injury or considerable damage to property **will** result if the appropriate safety measures are not taken.

Warning!
means that death, serious injury or considerable damage to property **can** result if the appropriate safety measures are not taken.

Caution!
means that light injury or damage to property can result if the appropriate safety measures are not taken.

Note: is an important piece of information about the product, how to use the product, or the relevant section of the documentation to which particular attention is to be drawn.

Certified usage

Please observe the following:

Warning
The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by Hirschmann. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

Safety Guideline Password

This device is a safety technological product. In the interest of your own safety we recommend strongly to change the password immediately.

Safety Guidelines Power Supply

☐ Switch the basic devices on only when the case is closed.

Warning!
The devices may only be connected to the supply voltage shown on the type plate.

The devices are designed for operation with a safety extra-low voltage.Thus, they may only be connected to the supply voltage connections and to the signal contact with PELV circuits or alternatively SELV circuits with the voltage restrictions in accordance with IEC/EN 60950.

☐ For the case where the module is operated with external power supply: Use only a safety extra-low voltage in accordance with IEC 950/EN 60 950/VDE 0805 to power the system.

☐ Relevant for North America:
The subject unit is to be suppplied by a Class 2 power source complying with the requirements of the National Electrical Code, table 11(b). If power is redundant supplied (two individual power sources) the power sources together should comply with the requirements of the National Electrical Code, table 11 (b).

☐ Relevant for North America:
Use 60/75°C or 75°C copper(CU)wire only.

Safety Guidelines Shielding Ground

Note: The shielding ground of the connectable twisted pairs lines is connected to the front panel as a conductor.

☐ Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

Safety Guidelines Housing

Warning!
Only technicians authorized by Hirschmann are permitted to open the housing.

Note: The device is grounded via the separated ground screw. It is located on the left under the front panel.

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

Warning!
The ventilation slits must not be covered so as to ensure free air circulation.

The distance to the ventilation slots of the housing has to be a minimum of 10 cm.

Never insert pointed objects (thin screwdrivers, wires, etc.) into the inside of the subrack! Failure to observe this point may result in injuries caused by electric shocks.

Note: According to EN 60950 the device may only be operated in a fire protective housing.

Note: The housing has to be mounted in upright position.

Safety Guidelines Environment

Warning!
The device may only be operated in the listed maximum surrounding air temperature range at the listed relative air humidity range (non-condensing).

☐ The installation location is to be selected so as to ensure compliance with the climatic limits listed in the Technical Data.

☐ To be used in a Pollution Degree 2 environment only.

Staff qualification requirements

Note: Qualified personnel, as understood in this manual and in the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

– trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards

– trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering

– trained in providing first aid.

General Safety Instructions

☐ This device is electrically operated. Adhere strictly to the safety requirements relating to voltages applied to the device as described in the operating instructions!

Warning!
Failure to observe the information given in the warnings could result in serious injury and/or major damage.

Only personnel that have received appropriate training should operate this device or work in its immediate vicinity. The personnel must be fully familiar with all of the warnings and maintenance measures in these operating instructions.

Correct transport, storage, and assembly as well as careful operation and maintenance are essential in ensuring safe and reliable operation of this device.

Use only undamaged parts!

☐ These products are only to be used in the manner indicated in this version of the "Description and Operating Instructions".

☐ Particular attention is to be paid to all warnings and items of information relating to safety.

Warning!
Any work that may have to be performed on the electrical installation should be performed by fully qualified technicians only.

Based specifications and standards:

The devices fulfil the following specifications and standards:
– EN 61000-6-2:2001 Generic standards – Immunity for industrial environments
– EN 55022:1998 + A1 2000 + A2 2003 – Information technology equipment – Radio disturbance characteristics
– EN 60950:1:2001 – Safety of Information Technology Equipment (ITE)
– EN 61131-2:2003 – Programmable Controllers
– CFR-47 Part 15:2003 – Code of Federal Regulations
– UL 508:1998 – Underwriters Labratories Inc. Safety for Industrial Control Equipment.
– UL 1604 Electrical Equipment for Use in Class I and Class II, Div. 2 and Class III Hazardous (Classified).
– Germanischer Lloyd VI-7-3 Part1 Ed.2003 – Test Requirements for Electronic Equipment

Certified devices are marked with a certification identifier.

Notes on CE identification

The devices comply with the regulations of the following European directive:

89/336/EEC
Council Directive on the harmonization of the legal regulations of member states on electromagnetic compatibility (amended by Directives 91/263/EEC, 92/31/EEC and 93/68/EEC).

The EU declaration of conformity is kept available for the responsible authorities in accordance with the above-mentioned EU directives at:

Hirschmann Electronics
GmbH & Co. KG
Automation and Network Solutions
Stuttgarter Straße 45-51
D-72654 Neckartenzlingen
Telephone ++49 (0)7127 14-1480

The product can be used in the residential sphere (residential sphere, business and trade sphere and small companies) and in the industrial sphere.
– Interference proof:
EN 61000-6-2:2001
– Emitted immunity:
EN 55022:1998 + A1 2000 + A2 2003, Class A

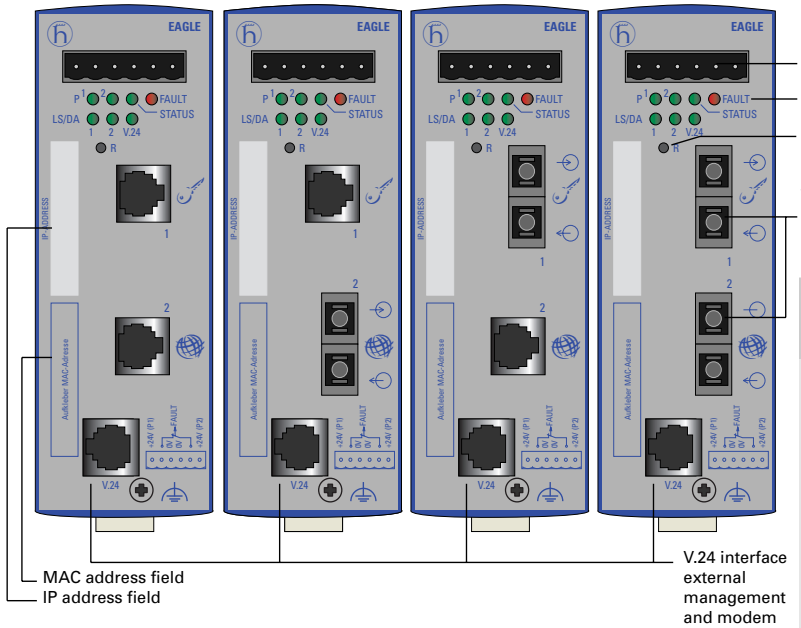
Warning!
This is a Class A device. This equipment may cause radio interference if used in a residential area; in this case it is the operator´s responsibility to take appropriate measures.

The precondition for compliance with EMC limit values is strict adherence to the construction guidelines specified in this description and operating instructions.

FCC Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, persuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Recycling Note:
After its use, this product has to be processed as electronic scrap and disposed of according to the prevailing waste disposal regulations of your community / district / country / state.



	Port 1 (trusted)				Port 2 (untrusted)			
	TX	MM	SM	LH	TX	MM	SM	LH
EAGLE TX/TX	x				x			
EAGLE TX/MM SC	x					x		
EAGLE TX/SM SC	x						x	
EAGLE TX/LH SC	x							x
EAGLE MM SC/TX		x			x			
EAGLE MM SC/MM SC		x				x		
EAGLE MM SC/SM SC		x					x	
EAGLE MM SC/LH SC		x						x
EAGLE FW TX/TX	x				x			
EAGLE FW TX/MM SC	x					x		
EAGLE FW TX/SM SC	x						x	
EAGLE FW TX/LH SC	x							x
EAGLE FW MM SC/TX		x			x			
EAGLE FW MM SC/MM SC		x				x		
EAGLE FW MM SC/SM SC		x					x	
EAGLE FW MM SC/LH SC		x						x

Fig. 1: Overview interfaces, display elements and controls of the EAGLE

1. Functional description

1.1 FIREWALL- AND VPN FUNCTIONS

Firewall functions

The EAGLE FW supports the following firewall functions:
– Stateful inspection firewall
– Transparent firewall:
  Single client / multi client
– Configurable firewall rules:
  – Received/transmitted data travel
  – Modem access
  – External management access
– IP masquerading, 1-to-1 NAT
– IP spoofing protection

VPN functions

The EAGLE supports the following virtual private network (VPN) functions:
– Multipoint VPN:
  Router and single client transparent mode
– VPN protocols: IPSec, L2TP
– Encoding algorithms:
  – DES-56
  – 3DES-168
  – AES-128, AES-192, AES-256
– Authentification:
  – Pre shared key (PSK)
  – X.509v3 certificates
– Hashing algorithms: MD5, SHA-1
– NAT-T support
– Firewall rules for every VPN connection

1.2 OPERATION MODES

This device protects the network which is to be safeguarded (trusted port) from outside influences (untrusted port). This can be intentional attacks or unauthorized accesses as well as disturbing network occurrences as e.g. overload.

In the state of delivery the device operates in the multi client transparent mode (MCT mode). In this mode there are no network settings necessary for operation (e.g. for subnets).

This pre-configuration of the firewall ensures that every IP travel from the trusted network () is possible, but not the other way round: travel from the untrusted () to the trusted network is not possible. Therefore already in the state of delivery configuraion attacks from outside into the trusted network are impossible.

Multi Client Transparent Mode (MCT mode) – Single Client Transparent Mode (SCT mode)

The MCT/SCT mode is a transparent bridge mode. In this mode the device operates as a 2 port bridge where only IP and ARP frames are transmitted, in compliance with the firewall rules.
The access to the device is possible, too, without configuring the IP address, using the address 1.1.1.1.

In the MCT mode several clients are supported in the network which is to be protected, whereas in the SCT mode only one client is possible.

Please note that you have to carry through the corresponding IP configurations in the MCT mode.

Note: In the MCT mode no virtual private networks (VPN) are supported.

Router mode

In the router mode the device operates as a 2 port router. The corresponding IP configurations are to be carried through. You will find a detailed description in the EAGLE manual.

Note: In the router mode another network access to the trusted network is supported via the V.24 interface of the EAGLE, using PPP. In this case the communication with the EAGLE itself or with the devices in the trusted network is possible, in compliance with the firewall rules for the modem connection.

PPPoE/PPTP mode

In the PPPoE/PPTP mode the EAGLE operates the same way as in the router mode, with the difference that on the trusted port () the PPPoE/PPTP protocol is used. Therefore internet access e.g. via a DSL modem becomes possible.

1.3 SPECIFIC FUNCTIONS OF THE TP/TX INTERFACE

Link control

The EAGLE monitors the connected TP/TX line segments for short-circuit or interrupt using regular link test pulses in accordance with IEEE standard 802.3 10/100BASE-T/TX. The EAGLE does not transmit any data to a TP/TX segment from which it does not receive a link test pulse.

Note: A non-occupied interface is assessed as a line interrupt. The TP/TX line to terminal equipment which is switched off is likewise assessed as a line interrupt as the de-energised bus coupler cannot transmit link test pulses.

Auto polarity exchange

If the receive line pair is incorrectly connected (RD+ and RD- switched) polarity is automatically reversed.

Autonegotiation

Autonegotiation is a procedure in which the switch automatically selects the operating mode of its 10/100 RJ-45 ports. When a connection is set up for the first time, the switch detects the speed (10 or 100 Mbit/s) and the transmission mode of the connected network (half duplex or full duplex).

Autocrossing

If the autonegotiation function is active, the EAGLE detects the transmit and receive pairs (MDI, MDI-X). The EAGLE automatically configures its port for the correct transmit and receive pins. Consequently it does not matter whether you connect devices using a cross-over or straight cable.

1.4 SPECIFIC FUNCTIONS OF THE F/O INTERFACE

Link control

According to IEEE 802.3 standard 100BASE-FX an EAGLE monitors the attached F/O lines for open circuit conditions.

1.5 FURTHER FUNCTIONS AND FEATURES

Diagnosis

In case of a reset the EAGLE runs a hardware self test. During operation an integrated watch dog (monitoring unit) monitors the function of the software.

Reset

The EAGLE will be reset by the following actions:
– management
– input voltages fall below a threshold
– watchdog
– switching between transparent mode and router mode

After a reset the following actions are carried through:
– self test
– initialization

1.6 DISPLAY ELEMENTS

Equipment status

These LEDs provide information about statuses which affect the function of the entire EAGLE.

P1 – Power 1 (green LED)
– lit: – supply voltage 1 present
– not lit: – supply voltage 1 is less than 9.6 V

P2 – Power 2 (green LED)
– lit: – supply voltage 2 present
– not lit: – supply voltage 2 is less than 9.6 V

FAULT – Failure (red LED)
– lit: – The indicator contact is open, i.e. it indicates an error.
– not lit: – The indicator contact is closed, i.e. it does not indicate an error.

STATUS – Device status
(yellow/green LED)
– flashes yellow: – Initialization of the device
– lit green: – Device is operational

Port Status

These LEDs display port-related information.

LS/DA 1 to 2, V.24 – Data, Link status
(three green LEDs)
– not lit: – no valid link
– lit green: – valid link
– blinking green (3 blinks per period) – port is disabled
– flashes yellow: – receiving data
– running light: – initialization phase after a reset

Display of ACA function

The LEDs "STATUS" and "V.24" together display information on the functionality of the AutoConfiguration Adapter (ACA).

STATUS and V.24 – ACA activity
(two green LEDs)
– both LEDs flash simultaneously (slow): – ACA writing process
– both LEDs flash simultaneously (fast): – ACA reading process
– both LEDs flash alternated fast (about 5 sec.): – ACA error

1.7 CONTROLS

R – Recovery button

The Recovery button is used to set the device into the following states:

– Restart
  To produce a restart, press the recovery button longer than 1,5 and shorter than 7 seconds, until the STATUS LED lits red.
– Flashing the firmware
  To produce the flashing of the firmware, press the recovery button longer than 7 seconds, until all port LEDs (LS/DA) lit green.
– Recovery procedure
  To produce the recovery procedure, press the recovery button 6 times shortly. The EAGLE answers flashing 6 times yellow with the STATUS LED. Press the button again 6 times.

In the „Manual EAGLE Management – Industrial ETHERNET Firewall/VPN System" you will find detailed information how to carry through the recovery actions.

1.8 INTERFACES

10/100 MBit/s connection

10/100 Mbit Ports (8-pin R45 sockets) allow terminal equipment or independent network segments complying with the standards IEEE 802.3 100BASE-TX / 10BASE-T to be connected. These ports support autonegotiation, autocrossing and the autopolarity function.

Factory settings: autonegotiation active.

The socket casings are electrically connected to the front panel of the EAGLE.The pin configuration complies with MDI-X.

– **Pin configuration** of the RJ45 socket:
  – TD+: pin 3, TD-: pin 6
  – RD+: pin 1, RD-: pin 2
  – remaining pins: not used.

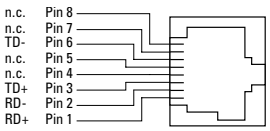


Fig. 2: Pin configuration of an TP/TX interface

100 Mbit/s connection

100 MBit/s F/O ports (DSC sockets) allow terminal equipment or independent network segments complying with the standard IEEE 802.3 100BASE-FX to be connected.
State on delivery: full duplex.

Note: Make sure, that you conncet LH ports only to LH ports, SM ports only to SM ports and MM ports only to MM ports.

V.24 interface
(external management, modem)

A serial interface for local connection of
– an external management station (VT100 terminal or a PC with corresponding terminal emulation) is available via the RJ11 socket (V.24 interface). A link can thus be established with the User Interface UI.
– an AutoConfiguration Adapter ACA 11 is available via the RJ11 socket (V.24 interface).
– an analog modem is available.

Note: If necessary, the modem access is to be activated via PPP. For the modem access you need an adapter connector (not included in the state of delivery).

VT100 terminal settings:
– Speed: 9,600 Baud
– Data: 8 bit
– Stopbit: 1 bit
– Handshake: off
– Parity: none

The V.24 interface baud rate can be configured to 9,600 up to 56,800 baud. The factory default is 9,600 baud.

The socket casing is galvanically connected to the front panel of the device.

Note: In chapter 6 „Technical data" you find the order number for the terminal access cable which is to be ordered separately.

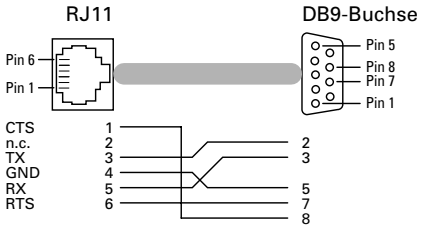


Fig. 3: Pin configuration of the V.24 interface for the management access

– **AutoConfiguration Adapter ACA:**
  The ACA is a device for saving the configuration data of an EAGLE, RS2../.., EAGLE or MACH 3000 switch. If one device should fail, the ACA facilitates a conceivable simple assumption of the configuration data by an alternative device of the same type.
  In case of a reset the EAGLE compares the contents of the ACA with its own configuration data. If the configuration data do not correspond, the EAGLE takes over the configuration data of the ACA.
  The function of the ACA is displayed by the LEDs "STATUS" and "V.24" (refer to chapter 1.6 display elements).
  The configuration data is saved on the ACA via the web based management.

6pin terminal block

The supply voltage and the indicator contact are connected via a 6pin terminal block with screw locking mechanism.

Warning!
The EAGLE equipments are designed for operation with a safety extra-low voltage.Thus, they may only be connected to the supply voltage connections and to the signal contact with PELV circuits or alternatively SELV circuits with the voltage restrictions in accordance with IEC/EN 60950.

– **Voltage supply**: Redundant voltage supplies are supported. Both inputs are decoupled. There is no load distribution. With redundant supply, the power pack supplies the EAGLE only with the higher output voltage. The supply voltage is electrically isolated from the housing.

– **Indicator contact:**
The indicator contact is used to supervise the functions of the EAGLE and thus facilitates remote diagnosis.
Contact interrupt indicates the following by means of a potential-free indicator contact (relay contact, closed circuit):
– the failure of at least one of the two supply voltages.
– a permanent fault in the EAGLE (internal 3,3 V DC voltage, supply voltage 1 or 2 < 9.6 V, ...).
– the faulty link status of at least one port. The indication of the link state on the EAGLE can be masked on a port-by-port basis using the management software. State of delivery: there is no link test.
– self test error

Note: In the case of the voltage supply being routed without redundancy, the EAGLE indicates the failure of a supply voltage. You can prevent this message by feeding in the supply voltage through both inputs.

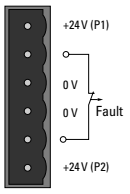


Fig. 4: Pin configuration of 6pin terminal block

Ground connection
The EAGLE is grounded via a separate screw connection.

2. Configuration

To get access to the EAGLE, you act as follows (device in the state of delivery):
☐ To configure the EAGLE, start a web browser with https capability on the PC connected to the trusted port (🖉) (e. g. MS Internet Explorer V. 5.0 or higher).

☐ Connect the untrusted port (🌐) to your network.

☐ In the address field of the web browser you enter the following address: https://1.1.1.1/

Result: The configuration connection to the EAGLE is being built up. A security note is displayed.

☐ Quit the security note with “Yes”.
☐ For login you enter:
– Login: admin
– Password: private
(Observe the use of small and capital letters!)

Result: The administrator website of the EAGLE is displayed.

☐ Configure the device.

Alternative you can carry through the IP configuration for the MCT mode via the HiDiscovery protocol. You will find the HiDiscovery software on the CD ROM which is included in the scope of delivery.

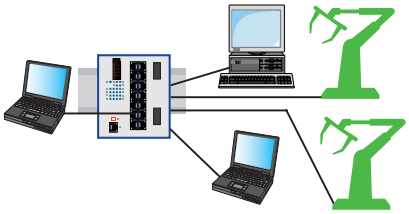


Fig. 5: Configuration before installing the EAGLE (example)

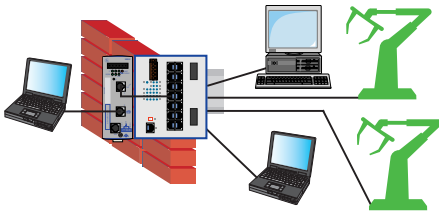


Fig. 6: Configuration with firewall after installing the EAGLE (example)

Note: If the configuration connection to the EAGLE is not built up, you will find detailed information in the „Manual EAGLE Management – Industrial ETHERNET Firewall/VPN System“.

3. Assembly, startup procedure and dismantling

Before installation and startup please pay attention to the security notes on the pages 2 and 3. With the following steps you set the EAGLE into operation:

3.1 UNPACKING, CHECKING

☐ Check whether the package was delivered complete (see scope of delivery).
☐ Check the individual parts for transport damage.

⚠ **Warning!**
Use only undamaged parts!

3.2 ASSEMBLY

The equipment is delivered in a ready-to-operate condition. The following procedure is appropriate for assembly:

☐ Pull the terminal block off the EAGLE and wire up the supply voltage and indicator lines.
☐ Fit the EAGLE on a 35 mm standard bar to DIN EN 50 022.
☐ Attach the upper snap-on slide bar of the EAGLE to the standard bar and press it down until it locks in position.
☐ Connect the device to the local network or the local PC which is to be protected (🖉).
☐ Connect the socket for connection to the external network (🌐), e. g. the Internet. (Via this network the connctions to the remote device or the remote network are realized.)

Notes:
– The front panel of the EAGLE is grounded via a separate ground connection.
– Do not open the housing.
– The shielding ground of the twisted pair lines which can be connected is electrically connected to the front panel.

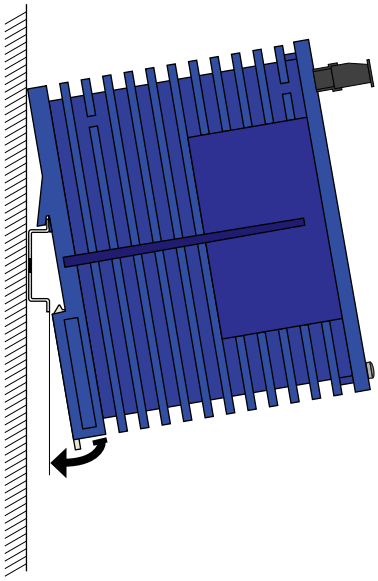


Fig. 7: Assembling the EAGLE

3.3 STARTUP PROCEDURE

You start up the EAGLE by connecting the supply voltage via the 6-pin terminal block. Lock the terminal block with the locking screw at the side.

3.4 DISMANTLING

☐ To take the EAGLE off the ISO/DIN rail, insert a screwdriver horizontally under the housing into the locking slide, pull it (without tipping the screwdriver) downwards and lift the EAGLE upwards.

4. Further support

In the event of technical queries, please talk to the Hirschmann contract partner responsible for looking after your account or directly to the Hirschmann office. You can find the addresses of our contract partners
– on the Internet
(http://www.hirschmann.de).

Our support line is also at your disposal:
Tel. +49(1805) 14-1538
Fax +49(7127) 14-1551

Answers to Frequently Asked Questions can be found on the Hirschmann internet site www.hirschmann.de
The FAQs are located in the Automation and Network Solutions section.
www.hicomcenter.com gives you an up-to-date overview of training courses about technology and products.

5. Technical data

General data

Operating voltage	NEC Class 2 power source 12VDC or 24 VDC (-25% +33%) safety extra-low voltage (SELV/PELV, redundant inputs decoupled), 5 A maximum	
Buffer time	min. 10 ms at 24 VDC	
Potential difference between input voltage and housing	Potential difference to input voltage, +24 VDC: 32 VDC Potential difference to input voltage, ground: -32 VDC	
Power consumption		
EAGLE (with 2 TX ports)	7.2 W max. at 24 VDC, 24.6 Btu (IT)/h	
EAGLE (with 1 TX port and 1 FX port)	8.4 W max. at 24 VDC, 28.7 Btu (IT)/h	
EAGLE (with 2 FX ports)	9.6 W max. at 24 VDC, 32.8 Btu (IT)/h	
Overload current protection at input	non-changeable fuse	
Dimensions W x H x D	46 mm x 131 mm x 111 mm	1.8 in x 5.2 in x 4.4 in
Weight	340 g	0.8 lb
Ambient temperature	Surrounding air: 0 °C to + 60 °C	32 °F to 140 °F
Storage temperature	Surrounding air: - 40 °C to + 70 °C	-40 °F to 158 °F
Humidity	10% to 95% (non condensing)	
Atmospheric pressure	Suitable for operation up to 2000 m (6561 ft), 795 hPa	
Pollution Degree	2	
Laser protection	Class 1 conforming to EN 60825-1 (2001)	
Protection type	IP 20	
Interference proof		
Discharge of static electricity		
Contact discharge	EN 61000-4-2 Test level 3	
Air discharge	EN 61000-4-2 Test level 3	
Electromagnetic fields	EN 61000-4-3 Test level 3	
Fast transients	EN 61000-4-4 Test level 3	
Surge voltage symmetrical	EN 61000-4-5 Test level 2	
Surge voltage asymmetrical	EN 61000-4-5 Test level 3	
Cable-based RF faults	EN 61000-4-6 Test level 3	
EMC emitted immunity		
EN 55022	Class A	
FCC 47 CFR Part 15	Class A	
Germanischer Lloyd	Rules for Classification and Construction VI - 7 - 3 Part 1, Ed. 2003	
Stability		
Vibration	IEC 60068-2-6 Test FC, testing level in line with IEC 61131-2 E2 CDV and Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1	
Shock	IEC 60068-2-27 Test Ea, testing level in line with IEC 61131-2 E2 CDV	
Certifications		
cUL 508 / CSA 22.2 No.142	complies with	
cUL 1604 / CSA 22.2 No.213	pending	
Germanischer Lloyd	complies with	

Network size

TX port 10BASE-T/100BASE-TX		
Length of a twisted pair segment	100 m approx.	
F/O port 100BASE-FX		
According to IEEE 802.3u 100BASE-FX		
System attenuation		
50/125 µm fiber (multimode) (MM)	0 to 8 dB	
62.5/125 µm fiber (multimode) (MM)	0 to 11 dB	
9/125 µm fiber (singlemode)	0 to 16 dB	
Wave length (SM)	1300 nm	
9/125 µm fiber (singlemode), Longhaul	7 to 29 dB	
Wave length (LH)	1550 nm	
F/O line length (example)		
50/125 µm fiber (MM)	5 km approx.	(data of fiber: 1.0 dB/km, 800 MHz∗km)
62.5/125 µm fiber (MM)	4 km approx.	(data of fiber: 1.0 dB/km, 500 MHz∗km)
9/125 µm fiber (SM)	30 km approx.	(data of fiber: 1300 nm, 0.4 dB/km)
9/125 µm fiber Longhoul (LH)	24 to 86.6 km	(data of fiber: 1550 nm, 0.3 dB/km)

Interfaces

EAGLE	V.24 port	external management, modem, ACA
	Indicator contact	1 A maximum, 24 V
in addition 2 type depending ports each:		

	Port 1 (trusted)	Port 2 (untrusted)
– EAGLE TX/TX	TX port with RJ-45 socket (10/100 MBit/s)	TX port with RJ-45 socket (10/100 MBit/s)
– EAGLE TX/MM SC	TX port with RJ-45 socket (10/100 MBit/s)	FX port (multimode / MM)
– EAGLE TX/SM SC	TX port with RJ-45 socket (10/100 MBit/s)	FX port (singlemode 1300 nm / SM)
– EAGLE TX/LH SC	TX port with RJ-45 socket (10/100 MBit/s)	FX port (singlemode 1550 nm / LH)
– EAGLE MM SC/TX	FX port (multimode / MM)	TX port with RJ-45 socket (10/100 MBit/s)
– EAGLE MM SC/MM SC	FX port (multimode / MM)	FX port (multimode / MM)
– EAGLE MM SC/SM SC	FX port (multimode / MM)	FX port (singlemode 1300 nm / SM)
– EAGLE MM SC/LH SC	FX port (multimode / MM)	FX port (singlemode 1550 nm / LH)
– EAGLE FW TX/TX	TX port with RJ-45 socket (10/100 MBit/s)	TX port with RJ-45 socket (10/100 MBit/s)
– EAGLE FW TX/MM SC	TX port with RJ-45 socket (10/100 MBit/s)	FX port (multimode / MM)
– EAGLE FW TX/SM SC	TX port with RJ-45 socket (10/100 MBit/s)	FX port (singlemode 1300 nm / SM)
– EAGLE FW TX/LH SC	TX port with RJ-45 socket (10/100 MBit/s)	FX port (singlemode 1550 nm / LH)
– EAGLE FW MM SC/TX	FX port (multimode / MM)	TX port with RJ-45 socket (10/100 MBit/s)
– EAGLE FW MM SC/MM SC	FX port (multimode / MM)	FX port (multimode / MM)
– EAGLE FW MM SC/SM SC	FX port (multimode / MM)	FX port (singlemode 1300 nm / SM)
– EAGLE FW MM SC/LH SC	FX port (multimode / MM)	FX port (singlemode 1550 nm / LH)

Displays

Equipment status	1 x green LED	**P1** – power 1, supply voltage 1 present
	1 x green LED	**P2** – power 2, supply voltage 2 present
	1 x red LED	**FAULT** – indicator contact is open and indicates error
	1 x red/green LED	**STATUS** – booting, heartbeat, system error
Port status	3 x green LED	**LS/DA 1 to 2, V.24** – data, link status

Controls

Recovery button **R**	– Restart – Recovery procedure – Flashing the firmware

Scope of delivery

EAGLE incl.	terminal block for supply voltage, description and operating instructions manual EAGLE on CD-ROM

Order number	
EAGLE TX/TX	943 011-001
EAGLE TX/MM SC	943 011-002
EAGLE TX/SM SC	943 011-003
EAGLE TX/LH SC	943 011-004
EAGLE MM SC/TX	943 011-005
EAGLE MM SC/MM SC	943 011-006
EAGLE MM SC/SM SC	943 011-007
EAGLE MM SC/LH SC	943 011-008
EAGLE FW TX/TX	943 011-011
EAGLE FW TX/MM SC	943 011-012
EAGLE FW TX/SM SC	943 011-013
EAGLE FW TX/LH SC	943 011-014
EAGLE FW MM SC/TX	943 011-015
EAGLE FW MM SC/MM SC	943 011-016
EAGLE FW MM SC/SM SC	943 011-017
EAGLE FW MM SC/LH SC	943 011-018

Accessories

ETHERNET manual	943 320-011
Manual	
Basics Industrial ETHERNET and TCP/IP	280 720-834
Terminal access cable	943 301-001
Rail Power Supply RPS 30	943 662-003
Rail Power Supply RPS 60	943 662-001
Rail Power Supply RPS 120	943 662-011
AutoConfiguration Adapter ACA 11	943 751-001

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