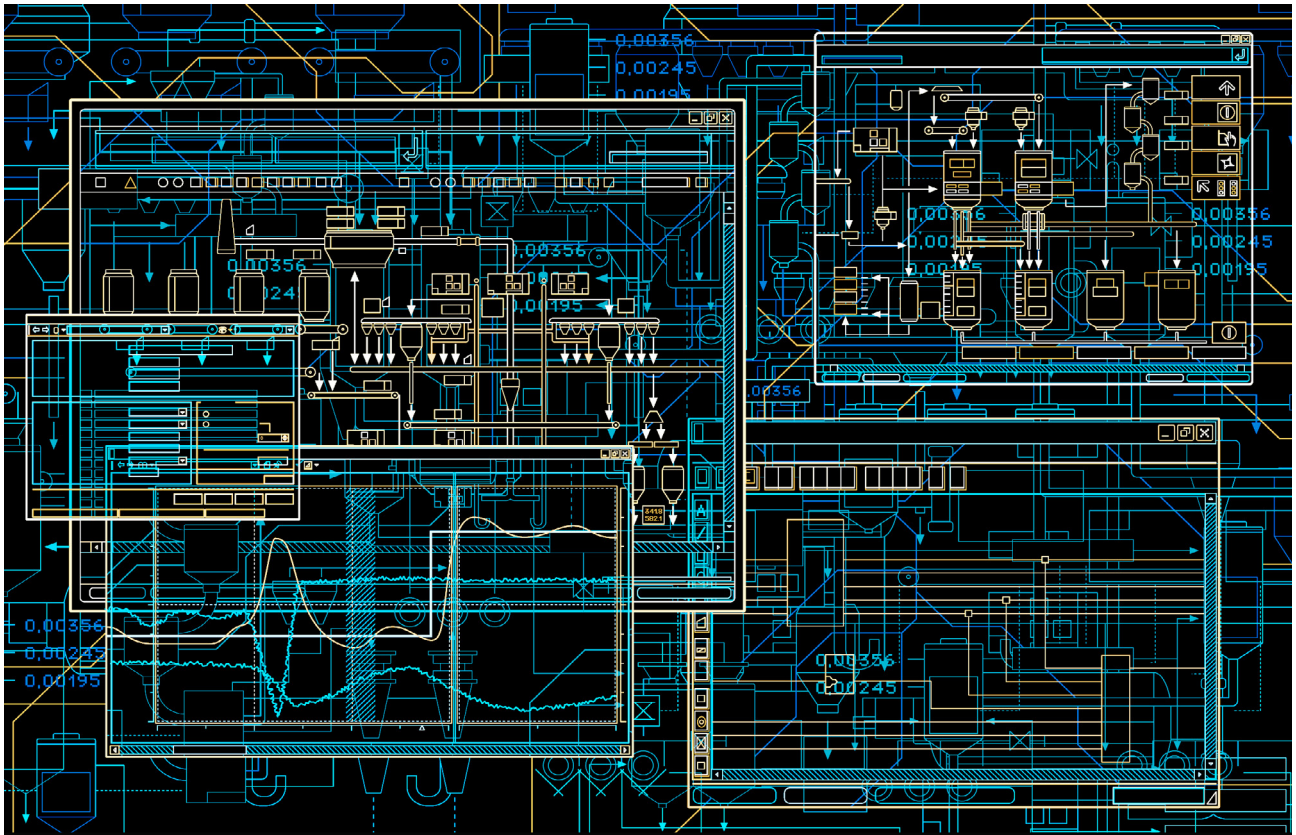

# 800xA Networks

## NE840
## User Manual

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## NE840
## User Manual

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# Table of Contents

# Safety

## Warning

Do not look directly into fibre optical fibre port or any connected fibre although this unit is designed to meet the Class 1 Laser regulations.

To reduce the risk of fire, use on No. 26 AWG or larger telecommunication line cord.

## Licensing Information

This device contains public available software which is under the GPL license. For more information see legal.pdf included with all firmware releases. This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit- http://www.openssl.org.

# Section 1 Industrial Routing Switch

NE840 is a high performance layer 2 industrial Ethernet switch designed for high network traffic applications. Various port configurations are available that can be further customized with SFP transceivers. NE804 is powered by the ABB Network Operating System (ABB NEOS).

NE840 is designed for 19” cabinet according to ETSI standard making it suitable for use in control room networks as well as for cabinets installed along railway track side or maritime installations. NE840 is designed to run efficiently from an AC power supply, the unit is also equipped with configurable I/O fault contact that make it ideal for easy installation and monitoring in industrial applications.

**NE840 Model**

| ABB Article Number | Denomination | Description |
|---|---|---|
| 3BSE080211R1 | NE840 | 8 x 10/100 Mbit/s, Ethernet TX, RJ-45<br>7 x 10/100/1000 Mbit/s, Gigabit Ethernet TX, RJ-45<br>4 x 100/1000 Mbit/s, pluggable connections transceivers supported, Ethernet FX or TX SFP<br>AC power supply |

## Housing

NE840 is designed for installation in 19” rack solutions according to ETSI standard with a shallow depth of 240 mm as shown in Figure 1. NE840 can also be wall mounted as an installation option.

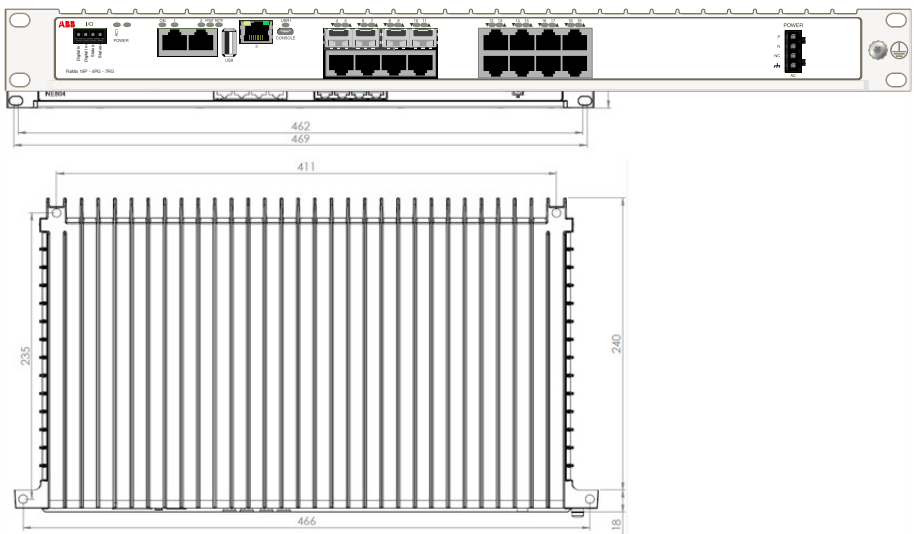



*Figure 1. Housing NE840*

**Specification**

| | |
|---|---|
| Dimension W x H x D | 480 x 43 x 258 mm<br>18,9 x 1,66 x 10,16” |
| Weight | 3.8 kg |
| Degree of protection | IP40 according to EN 60529 |
| Cooling | Convection |
| Mounting | 19” rack or wall-mounted |

# Section 2 Interface specifications

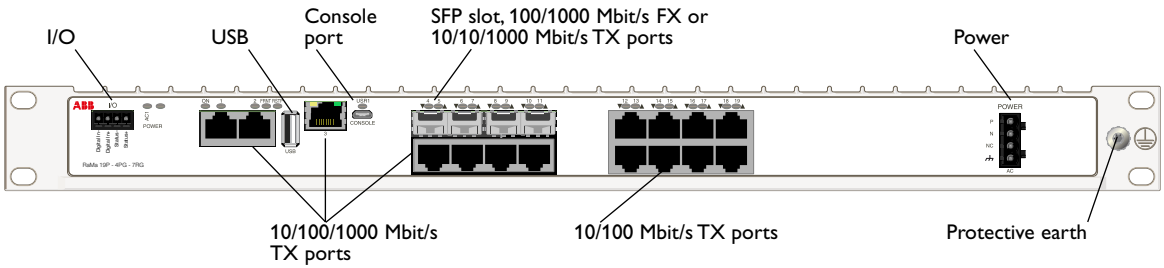
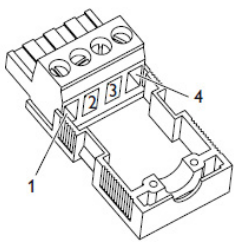



*Figure 2. Interface Specifications*

## Power Interface Specifications




| 4-position | Product marking | Direction | Description |
|---|---|---|---|
| No. 1 | P | Input | Power |
| No. 2 | N | Input | Neutral |
| No. 3 | NC | Input | No connection |
| No. 4 | | Input | Funtional earth |

*Figure 3. Power Interface Specifications*

* External supply current capability for proper start-up

| Power | |
|---|---|
| Rated Voltage | 115 to 230 VAC |
| Operating voltage | 90 to 264 VAC |
| Maximum nominal current consumption | 350mA @ 115 VAC 60Hz<br>210mA @ 230 VAC 50 Hz |
| Inrush current | 75mA2 @ 115 VAC<br>340mA2 @ 230 VAC |
| Rated frequency | 50/60 Hz |
| Startup current* | 2x nominal current |
| Polarity | Not applicable |
| Redundant power input | No |
| Isolation to | All other |
| Connection | Detachable screw terminal |
| Connector size | 0.2 – 2.5 $mm^2$ (AWG 24 – 12) |
| Shielded cable | Not required |

* External supply current capability for proper start-up

## Console

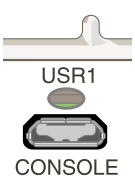



*Figure 4. Connection to Console Port*

The console port shown in the Figure 4 can be used to connect to the CLI (Command Line Interface). The console connector is a micro USB cable that connects to a FTDI FT232R USB to serial converter internally. For drivers please see www.ftdichip.com and download the appropriate VCP driver.

| Console | |
|---|---|
| Electrical specification | USB 2.0 device interface |
| Data rate | High speed 480mbit/s |
| Circuit type | SE LV |
| Maximum supply current | 100 mA |
| Isolation to | All other except USB |
| Galvanic connection to | USB |
| Connection | USB Micro-B connector in device mode |

## USB

*Figure 5. USB*

| USB | |
|---|---|
| Electrical specification | USB 2.0 host interface |
| Data rate | High speed 480mbit/s |
| Circuit type | SE LV |
| Maximum supply current | 500 mA |
| Isolation to | All other except console |
| Connection | USB receptacle connector type A |
| Conductive housing | Yes |

## Network Ports

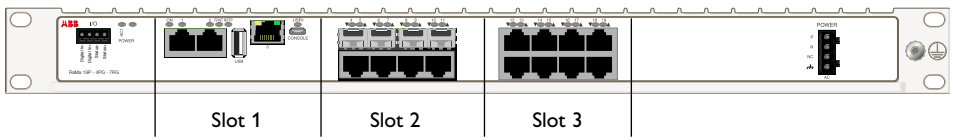



*Figure 6. Network Ports*

| **NE840** | |
|---|---|
| **Slot 1** | |
| 1 | 10/100/1000 Mbit/s, TX port |
| 2 | 10/100/1000 Mbit/s, TX port |
| 3 | 10/100/1000 Mbit/s, TX port |
| **Slot 2** | |
| 4 | 10/100/1000 Mbit/s, TX port |
| 5 | SFP slot |
| 6 | 10/100/1000 Mbit/s, TX port |
| 7 | SFP slot |
| 8 | 10/100/1000 Mbit/s, TX port |
| 9 | SFP slot |
| 10 | 10/100/1000 Mbit/s, TX port |
| 11 | SFP slot |

| Slot 3 | |
|---|---|
| 12 | 10/100 Mbit/s, TX port |
| 13 | 10/100 Mbit/s, TX port |
| 14 | 10/100 Mbit/s, TX port |
| 15 | 10/100 Mbit/s, TX port |
| 16 | 10/100 Mbit/s, TX port |
| 17 | 10/100 Mbit/s, TX port |
| 18 | 10/100 Mbit/s, TX port |
| 19 | 10/100 Mbit/s, TX port |

## TX Ports: Slot 1 and 2: 10/100/1000 Mbit/s, Slot 3: 10/100 Mbit/s

| Ethernet TX | |
|---|---|
| Electrical specification | IEEE std 802.3. 2005 Edition |
| Data rate | Slot 1 and 2: 10 Mbit/s, 100 Mbit/s, 1000 Mbit/s, manual or auto<br>Slot 3: 10 Mbit/s, 100 Mbit/s manual or auto |
| Duplex | Full or half, manual or auto |
| Circuit type | TNV-1 |
| Transmission range | Up to 150 m with CAT5e cable or better |
| Isolation to | All other |
| Connection | RJ-45 auto MDI/MDI-X |
| Shielded cable | Not required, except when installed in Railway applications as signalling and telecommunications apparatus and located close to rails* |
| Conductive housing | Yes |

* Note: Railway installation close to the rails. To minimise the risk of interference, a shielded cable is recommended when the cable is located inside 3 m boundary to the rails and connected to this port. The cable shield should be properly connected (360°) to an earthing point within 1 m from this port. This earthing point should have a low impedance connection to the conductive enclosure of the apparatus cabinet, or similar, where the unit is built-in. This conductive enclosure should be connected to the earthing system of an installation and may be directly connected to the functional earth. Refer also to Safety section.

| Slot 1 and 2, 10/100/1000 Mbit/s: | | |
|---|---|---|
| **Position** | **Direction*** | **Description** |
| 1 | In/Out | BI_DA+ |
| 2 | In/Out | BI_DA– |
| 3 | In/Out | BI_DB+ |
| 4 | In/Out | BI_DC+ |
| 5 | In/Out | BI_DC- |
| 6 | In/Out | BI_DB- |
| 7 | In/Out | BI_DD+ |
| 8 | In/Out | BI_DD- |
| Shield | In/Out | Connected to Functional earth |

* Direction relative this unit.

| Slot 3, 10/100 Mbit/s | | |
|---|---|---|
| **Position** | **Direction*** | **Description** |
| 1 | In/Out | TD+ |
| 2 | In/Out | TD– |
| 3 | In/Out | RD+ |
| 4 | In/Out | Not connected |
| 5 | In/Out | Not connected |
| 6 | In/Out | RD- |
| 7 | In/Out | Not connected |
| 8 | In/Out | Not connected |
| Shield | In/Out | Connected to Functional earth |

* Direction relative this unit.

*Figure 7. TX Ports*

## SFP Slot

Each SFP slot can hold one SFP transceiver for copper or fibre cable. Fibre transceivers distances range from 550 m (0.34 mi) to 120 km (74.6 mi). For supported transceivers, see SFP data sheet.

| Position | Direction* | Description |
|---|---|---|
| Rx | In | Receive port |
| Tx | Out | Transmit port |

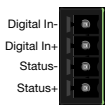
* Direction relative this unit.

*Figure 8. SFP Slot*

| SFP Ports | |
|---|---|
| Optical/Electrical specification | IEEE std 802.3. 2005 Edition |
| Data rate | 10 Mbit/s, 100 Mbit/s, 1000 Mbit/s |
| Duplex | Full or half, manual or auto |
| Transmission range | Depending on transceiver |
| Connection | SFP slot holding fibre transceiver or copper transceiver |

* 100 Mbit/s or 1000 Mbit/s transceiver supported.

## I/O Connection

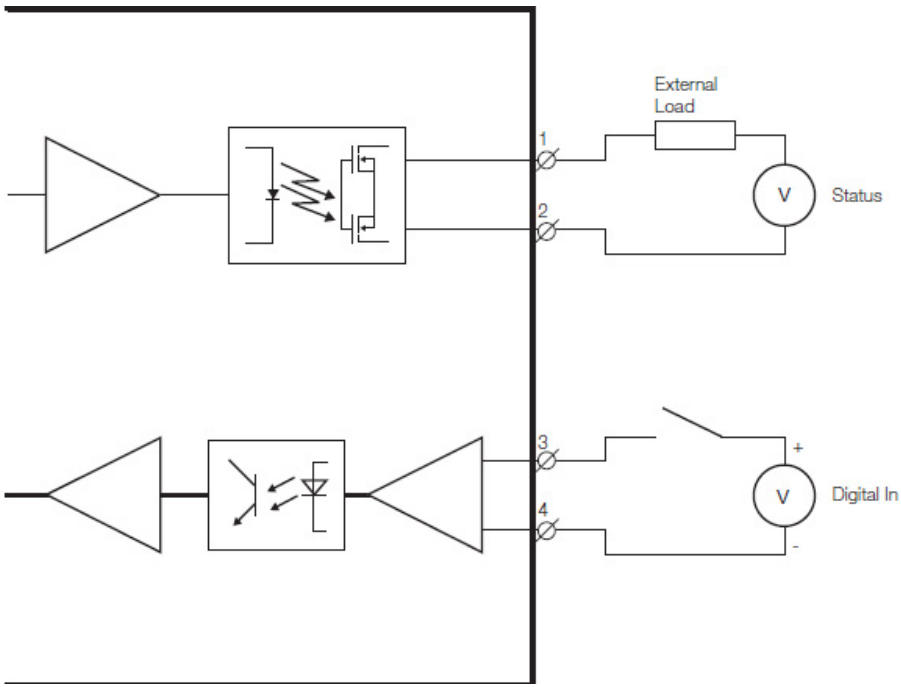



| Product marking | Direction | Description |
|---|---|---|
| Digital in – | Input | Digital in – |
| Digital in + | Input | Digital in + |
| Status – | Output | Alarm relay (status) contact |
| Status + | Output | Alarm relay (status) contact |

*Figure 9. I/O Connection*

The status output is a potential free, opto-isolated normally closed solid-state relay. This can be configured to monitor various alarm events within the NE804 unit, see *NEOS User Manual*. An external load in series with an external voltage source is required for proper functionality. For voltage/current ratings, see Interface specifications section.

The Digital in is an opto-isolated digital input which can be used to monitor external events. For voltage/current ratings, see Interface specifications section.




| IO / Relay Output | |
|---|---|
| Connect resistance | 30 W |
| Isolation to | All other |
| Connection | Detachable screw terminal |
| Connector size | 0.2 – 2.5 $mm^2$(AWG 24 – 12) |
| Maximum voltage/ current | 60 VDC / 80 mA |

| **IO / Digital Input** | |
|---|---|
| Voltage levels | $V_{ih}$ > 8V Vil < 5V<br>$I_{in}$ = 2.9mA @60V |
| Isolation to | All other |
| Connection | Detachable screw terminal |
| Connector size | 0.2 – 2.5 $mm^2$ (AWG 24 – 12) |
| Maximum voltage/ current | 60 VDC |

## LED Indicators Power/CPU

| LED | Status | Description |
|---|---|---|
| ON | OFF | Unit has no power |
| | GREEN | All OK, no alarm condition |
| | RED | Alarm condition, or until unit has started up. (Alarm conditions are configurable, refer to *NEOS User Manual*. |
| | BLINK | Location indicator **Here I am**. Activated when connected to IPConfig Tool, or upon request from Web or CLI. |
| DC1 | OFF | Unit has no power |
| | GREEN | Power OK on DC1 |
| | RED | +DC1 input voltage is below operating voltage limit |
| DC2 | OFF | Unit has no power |
| | GREEN | Power OK on DC2 |
| | RED | +DC2 input voltage is below operating voltage limit |
| AC1 | OFF | Unit has no power |
| | GREEN | Power OK on AC1 |
| FRNT | OFF | FRNT disabled |
| | GREEN | FRNT OK |
| | RED | FRNT Error |
| | BLINK | Unit configured as FRNT Focal Point |
| RSTP | OFF | RSTP disabled |
| | GREEN | RSTP enabled |
| | BLINK | Unit elected as RSTP/STP root switch |
| USR1 | Configurable, see *WEOS User Manual* | |
| TX/FX ports | OFF | No link |
| | GREEN | Link established |
| | GREEN FLASH | Data traffic indication |
| | YELLOW | Port alarm and no link. Or if FRNT or RSTP mode, port is blocked |

### Modular Transceivers

For supported modular transceivers, refer to *Modular Transceivers User Guide (3BSE080641)*.

The unit supports ABB transceivers only.

## Mounting

This unit can either be rack-mounted or wall-mounted.

### Rack Mounting

For mounting into rack, use M6x25 or 1/4”x1” screws as shown in Figure 10.

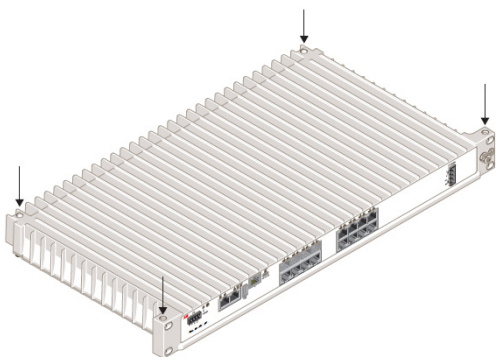


*Figure 10. Rack Mounting*

## Wall Mounting

If mounting onto a wall as shown in Figure 11, use maximum Ø6,4 mm or 1/4” screws.

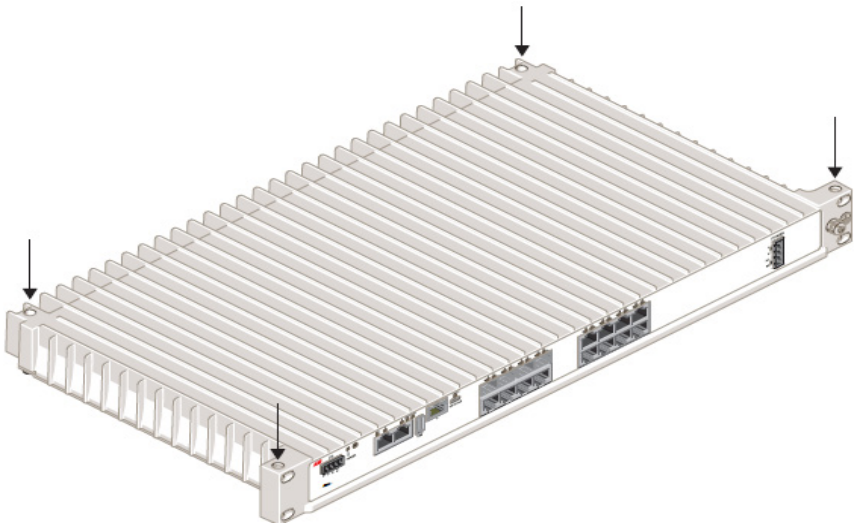


*Figure 11. Wall Mounting*

# Earth Connection

For correct function, the ground connection on the unit needs to be properly connected to a solid ground as shown in Figure 12.

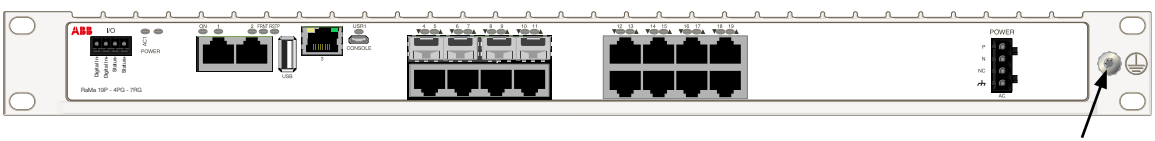


*Figure 12. Earth Connection*

# Getting Started

This product runs ABB Network Equipment Operating System (NEOS) which provides several management tools that can be used for configuration of the unit.

NeCo - is a Network configuration management tool (NCM) made for commissioning and maintenance of components in a network.

Web - Configuration of the unit using the web browser.

CLI - Configuration of the unit via the Command Line Interface.

If the computer is located in the same subnet as the switch you can easily use a web browser to configure the unit. Within the web you can configure most of the available functions.

For advanced network settings and more diagnostic information, please use the CLI. Detailed documentation is available in the chapter **The Command Line Management Tool** in the *NEOS User Manual*.

Factory default:

– IP address: 172.16.5.245

– Netmask: 255.255.252.0

– Gateway: Disabled

Consult your network administrator to know more on subnet.

# Configuration

Configure the unit via Web browser. The unit can easily be configured through a Web browser. Open the link http://172.16.5.245 in your web browser, and you will be prompted with a Login screen, where the default settings for Username and Password are:

– Username: admin

– Password: CS4dmin

Once you have logged in, you can use the extensive integrated help function describing all configuration options. Two common task when configuring a new switch is to assign appropriate IP settings, and to change the password of the admin account.

The password can be up to 64 characters long, and should consist of printable ASCII characters (ASCII 33-126); **Space** is not a valid password character.

For additional configuration information, *refer to System 800xA 6.0 Network Configuration (3BSE034463-600)* manual.

# Fibre Optic Handling

Fibre optic equipment needs special treatment. It is very sensitive to dust and dirt. If the fibre will be disconnected from the unit the protective hood on the transmitter/receiver must be connected. The protective hood must be kept on during transportation. The fibre optic cable must also be handle the same way.

If these recommendations are not followed the warranty might be jeopardized.

## Maintenance

No maintenance is required, as long as the unit is used as intended within the specified conditions.

# Cleaning of the Optical Connectors

In the event of contamination, the optical connectors should only be cleaned by the use of recommended cleaning fluids and correct cleaning equipment.

Recommended cleaning fluids:

- Methyl-, ethyl-, isopropyl- or isobutyl-alcohol
- Hexane
- Naphtha

# Agency Approvals and Standards Compliance

| ABB Article Number | Denomination | Type | Approval / Compliance |
|---|---|---|---|
| 3BSE080211R1 | NE840 | EMC | EN 61000-6-1, Electromagnetic compatibility – Immunity for residential environments<br>EN 61000-6-2, Electromagnetic compatibility – Immunity for industrial environments<br>EN 61000-6-4, Electromagnetic compatibility – Emission for industrial environments<br>EN 50121-4, Railway applications – Electromagnetic compatibility – Emission and immunity of the signalling and telecommunications apparatus<br>IEC 62236-4, Railway signalling and telecommunications apparatus |
| | | Safety | UL/IEC/EN 60950-1, IT equipment |
| | | Marine | DNV GL rules for classification – Ships and offshore units |

## Notice: FCC Part 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant 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.

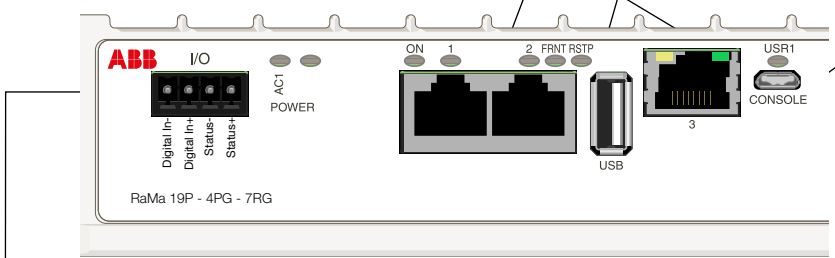
# Safety Control Drawing

| Position | Direction/description | Input/output values |
|---|---|---|
| 1 | In/out / BI_DA+ | Per port: |
| 2 | In/out / BI_DA– | U = ± 1 V (4V/us) |
| 3 | In/out / BI_DB+ | I = ± 20 mA |
| 4 | In/out / BI_DC+ | Data rate: |
| 5 | In/out / BI_DC– | 10/100/1000 Mbit/s |
| 6 | In/out / BI_DB– | |
| 7 | In/out / BI_DD+ | |
| 8 | In/out / BI_DD– | |
| Shield | Functional earth | |

Galvanically isolated via signal transformers and capacitively isolated to GND/Functional earth through a 2kV 1000pF capacitor.
See user manual for proven transient protection.

| Position | Direction/description | Output values |
|---|---|---|
| 1 | Out / VBUS | $U_{out}$ = 5 VDC max |
| 2 | In/out / D– | $I_{out}$ = 500 mA max |
| 3 | In/out / D+ | |
| 4 | GND | |
| Shield | Functional earth | |

| Position | Direction/description | Output values |
|---|---|---|
| 1 | In / VBUS | U = 5 VDC max |
| 2 | In/out / D– | I = 100 mA max |
| 3 | In/out / D+ | |
| 4 | Not connected | |
| 5 | Functional earth | |

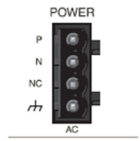



| Position | Direction/description | Input/Output values |
|---|---|---|
| Status + | IO / Status + | $U_{in}$ = 60 VDC max |
| Status – | IO / Status – | $I_{in}$ = 80 mA max |
| Digital in + | IO / Digital in + | $U_{in}$ = 60 VDC max |
| Digital in – | IO / Digital in – | $I_{in}$ = 2.9 mA max |

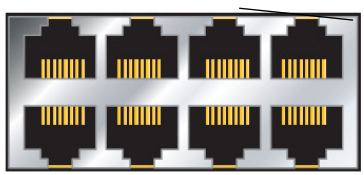
*Figure 13. Safety Control Drawing*

# AC Power Supply

| Direction/de-scription | Input values |
|---|---|
| In / P | $U_{in}$ = (90 – 264) VAC |
| In / N | $I_{in}$ = 350 mA@115 VAC |
| In / NC | |
| In / | |




| | |
|---|---|
| Degree of protection | IP 40 |
| Ambient temperature | –40°C to +70°C |



| Position | Direction* / description | Input/output values |
|---|---|---|
| 1 | In/out / TD+ | Per port: |
| 2 | In/out / TD– | U = ± 1 V (4V/us) |
| 3 | In/out / RD+ | I = ± 20 mA |
| 4 | Not connected | Data rate: |
| 5 | Not connected | 10/100 Mbit/s |
| 6 | In/out / RD– | |
| 7 | Not connected | |
| 8 | Not connected | |
| Shield | Functional earth | |

Galvanically isolated via signal transformers and capacitively isolated to functional earth through a 2kV 1000pF capacitor.
See user manual for proven transient protection.

* Direction relative this unit!

| Position | Direction* / description | Input/output values |
|---|---|---|
| Rx | In / Receive port | Max 5 dBm |
| Tx | Out / Transmit port | |

| Position | Direction* / description | Input/output values |
|---|---|---|
| 1 | In/out / BI_DA+ | Per port: |
| 2 | In/out / BI_DA– | U = ± 1 V (4V/us) |
| 3 | In/out / BI_DB+ | I = ± 20 mA |
| 4 | In/out / BI_DC+ | Data rate: |
| 5 | In/out / BI_DC– | 100/1000 Mbit/s |
| 6 | In/out / BI_DB– | |
| 7 | In/out / BI_DD+ | |
| 8 | In/out / BI_DD– | |
| Shield | Functional earth | |

Galvanically isolated via signal transformers and capacitively isolated to functional earth through a 2kV 1000pF capacitor.
See user manual for proven transient protection.

* Direction relative this unit!

# Type Tests and Environmental Conditions

| Environmental phenomena | Test | Description | Test levels |
|---|---|---|---|
| ESD | EN 61000-4-2 | Enclosure contact | ±6 kV |
| | | Enclosure air | ±8 kV |
| RF field AM modulated | IEC 61000-4-3 | Enclosure | 20 V/m 80% AM (1 kHz), 80 – 2700 MHz<br>10V/m 80% AM (1 kHz), 2700-6000 MHz |
| Fast transients | EN 61000-4-4 | Power port | ±2 kV |
| | | Signal ports | ±2 kV |

| | | | |
|---|---|---|---|
| Surge | EN 61000-4-5 | Power port | ± 2 kV line to earth, ± 1 kV line to line |
| | | Signal ports | ± 2 kV line to earth, ± 1 kV line to line |
| RF conducted | EN 61000-4-6 | Power port | 10 V 80% AM (1 kHz), 0.15 – 80 MHz |
| | | Signal ports | 10 V 80% AM (1 kHz), 0.15 – 80 MHz |
| Power frequency magnetic field | EN 61000-4-8 | Enclosure | 300 A/m 0, 16.7, 50, 60 Hz |
| Pulsed magnetic field | EN 61000-4-9 | Enclosure | 300 A/m |
| Radiated emission | EN 55022 | Enclosure | Class A |
| | FCC part 15 | Enclosure | Class A |
| Conducted emission | EN 55022 | DC power ports<br>Telecommunication ports Class B | Class B |
| | FCC part 15 | DC power ports | Class B |
| Dielectric strength | EN 60950 | Power port to all other ports | 1.5 kVrms, 50 Hz, 1 min |
| | | Signal ports to all other ports | 1.5 kVrms, 50 Hz, 1 min |
| Temperature | | Operating | –40 to +70°C (–40 to +158°F)* |
| | | | -40 to +55°C (AC models) |
| | | Storage and transport | –40 to +85°C (all models) |
| | | Maximum surface temperature | 135°C (temperature class T4) |

| | | | |
|---|---|---|---|
| Humidity | | Operating | 5 to 95% relative humidity |
| | | Storage and transport | 5 to 95% relative humidity |
| Altitude | | Operating | 2 000 m / 70 kPa |
| Service life | | Operating | 10 years |
| Vibration | IEC 60068-2-6 | Operating | 7.5 mm, 5 – 8 Hz<br>2 g, 8 – 500 Hz (19” rack mounting according to IEC 60297, DIN 41494) |
| Shock | IEC 60068-2-27 | Operating | 15 g, 11 ms (19” rack mounting according to IEC 60297, DIN 41494) |
| Enclosure | UL 94 | Aluminium / Zink | Flammability class V-0 (all models) |

# Referring Documents

| Type | Description | Document Number |
|---|---|---|
| User Manual | ABB NEOS User Manual | 3BSE080654 en |
| Network Configuration Guide | System 800xA 6.0 Network Configuration Guide | 3BSE034463-600 en |

# Cable Factory Reset on NE840

It is possible to set the unit to factory default settings by using two straight standard Ethernet RJ-45 cables.

1. Power off the switch and disconnect all Ethernet cables (copper and fibre).
2. Connect an Ethernet cable between Ethernet port 1/1 and Ethernet port 1/2 (that is, connect Ethernet ports 1 and 2 on in the left most slot by an Ethernet cable). The ports need to be connected directly by an Ethernet cable, that is, not through a hub or switch. Use a straight cable – not a cross-over cable – when connecting the ports.
3. Power on the unit.
4. Wait for the unit to start up. Control that the ON LED is flashing red.

The ON LED flashing indicates that the unit is now ready to be reset to factory default. You now have the choice to go ahead with the factory reset, or to skip factory reset and boot as normal.

## Proceed with Factory Reset

Acknowledge that you wish to conduct the factory reset by unplugging the Ethernet cables. The ON LED will stop flashing. This initiates the factory reset process, and after approximately 1 minute the unit will restart with factory default settings.

When the switch has booted up, the ON LED will show a green light, and is now ready to use.

## Skip the Factory Reset

To skip the factory reset process, just wait for approximately 30 seconds (after the ON LED starts flashing RED) without unplugging the Ethernet cables. The switch will conduct a normal boot with the existing settings.

Do not power off the unit while the factory reset process is in progress.

# Contact us

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