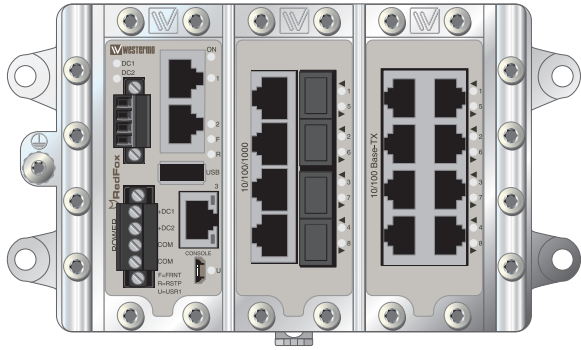


User Guide  
6641-22310



# RedFox Industrial

S E R I E S



*Industrial Routing Switch*

[www.westermo.com](http://www.westermo.com)





## Software tools

Related software tools are available in the folder software tools under technical support on the Westermo website.

## License 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>

## Legal information

The contents of this document are provided "as is". Except as required by applicable law, no warranties of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, are made in relation to the accuracy and reliability or contents of this document. Westermo reserves the right to revise this document or withdraw it at any time without prior notice.

Under no circumstances shall Westermo be responsible for any loss of data or income or any special, incidental, and consequential or indirect damages howsoever caused.

More information about Westermo can be found at the following Internet address:

**<http://www.westermo.com>**

## Safety



### **Before installation:**

Read this manual completely and gather all information on the unit. Make sure that you understand it fully. Check that your application does not exceed the safe operating specifications for this unit.

This unit should only be installed by qualified personnel.

This unit should be built-in to an apparatus cabinet, or similar, where access is restricted to service personnel only.

The power supply wiring must be sufficiently fused, and if necessary it must be possible to disconnect manually from the power supply. Ensure compliance to national installation regulations.

This unit uses convection cooling. To avoid obstructing the airflow around the unit, follow the spacing recommendations (see Cooling section).

Before powering-up, a protective earthing conductor must be connected to the protective earthing terminal and have a cross-sectional area of at least 1.5 mm<sup>2</sup>.



### **Before mounting, using or removing this unit:**

Prevent access to hazardous voltage by disconnecting the unit from power supply. Warning! Do not open connected unit. Hazardous voltage may occur within this unit when connected to power supply.



### **Class 1 Laser Product**

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.

### **Care recommendations**

Follow the care recommendations below to maintain full operation of unit and to fulfil the warranty obligations.

This unit must not be operating with removed covers or lids.

Do not attempt to disassemble the unit. There are no user serviceable parts inside.

Do not drop, knock or shake the unit, rough handling above the specification may cause damage to internal circuit boards.

Do not use harsh chemicals, cleaning solvents or strong detergents to clean the unit.

Do not paint the unit. Paint can clog the unit and prevent proper operation.

Do not expose the unit to any kind of liquids (rain, beverages, etc). The unit is not waterproof. Keep the unit within the specified humidity levels.

Do not use or store the unit in dusty, dirty areas, connectors as well as other mechanical part may be damaged.

If the unit is not working properly, contact the place of purchase, nearest Westermo distributor office or Westermo Tech support.

Fibre connectors are supplied with plugs to avoid contamination inside the optical port.

As soon as no optical fibre is mounted on the connector, e.g. for storage, service or transportation, the plug should be applied.

### **Warning:**

When this unit is operated at an ambient temperature above 60 °C, the External Surface of Equipment may exceed Touch Temperature Limit according to UL/IEC/EN 60950-1.

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

## **Note. 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.

## **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

## **Maintenance**

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

## Agency approvals and standards compliance

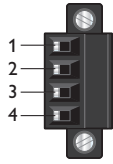
| Art.no    | Denomination       | Type   | Approval/compliance  |
|-----------|--------------------|--------|--|
| 3641-4000 | RFI-219-T3G        | EMC    | EN 50121-4, Railway applications – Electromagnetic compatibility – Emission and immunity of the signalling and telecommunications apparatus<br><br>EN 55022, Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement<br><br>EN 55024, Information technology equipment – Immunity characteristics Limits and methods of measurement<br><br>EN 61000-6-1, Electromagnetic compatibility – Immunity for residential environments<br><br>EN 61000-6-2, Electromagnetic compatibility – Immunity for industrial environments<br><br>EN 61000-6-3, Electromagnetic compatibility – Emission standards for residential, commercial and light-industrial environments<br><br>EN 61000-6-4, Electromagnetic compatibility – Emission for industrial environments<br><br>FCC Part 15 Class A |
| 3641-4110 | RFI-211-T3G        |        |  |
| 3641-4200 | RFI-215-F4G-T3G    |        |  |
| 3641-4210 | RFI-207-F4G-T3G    |        |  |
| 3641-4300 | RFI-219-F4G-T7G    |        |  |
| 3641-4305 | RFI-119-F4G-T7G    |        |  |
| 3641-4310 | RFI.-211-F4G-T7G   |        |  |
| 3641-4315 | RFI-111-F4G-T7G    |        |  |
| 3641-4320 | RFI-219-F4G-T7G-F8 |        |  |
|           |                    | Safety | UL/IEC/EN 60950-1, IT equipment  |
|           |                    | Marine | DNV Standard for Certification no. 2.4   |

**FCC Part 15.105 Notice:** 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.

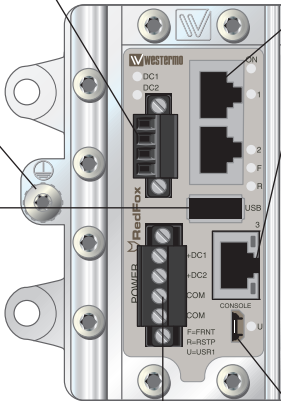
**EN 55022 Notice:** This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

# Safety control drawing

| Position | Direction / description | Input / Output values         |
|----------|-------------------------|-------------------------------|
| 1        | IO / Status +           | $U_{in} = 60 \text{ VDC max}$ |
| 2        | IO / Status -           | $I_{in} = 80 \text{ mA max}$  |
| 3        | IO / Digital In +       | $U_{in} = 60 \text{ VDC max}$ |
| 4        | IO / Digital In -       | $I_{in} = 2.9 \text{ mA max}$ |



M5 threaded hole for PE connection



| Position | Direction / description | Input/output values   |
|----------|-------------------------|---|
| 1        | In/Out / BI_DA+         | Per port:<br>$U = \pm 1 \text{ V (4V/us)}$<br>$I = \pm 20 \text{ mA}$<br>Data rate:<br>10/100/1000 Mbit/s |
| 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   | PE                      |   |

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

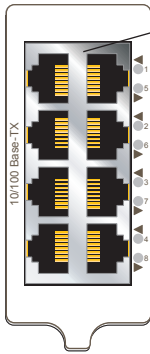
| Position | Direction / description | Output values   |
|----------|-------------------------|---|
| 1        | Out / VBUS              | $U_{out} = 5 \text{ VDC max}$<br>$I_{out} = 500 \text{ mA max}$ |
| 2        | In/Out / D-             |   |
| 3        | In/Out / D+             |   |
| 4        | GND                     |   |
| Shield   | PE                      |   |

| Position | Direction / description | Input/output values                                 |
|----------|-------------------------|---|
| 1        | In/Vbus                 | $U = 5 \text{ VDC max}$<br>$I = 100 \text{ mA max}$ |
| 2        | In/Out D-               |   |
| 3        | In/Out D+               |   |
| 4        | Not connected           |   |
| 5        | GND                     |   |

| Position | Direction / description | Input values  |
|----------|-------------------------|---|
| 1        | In / +DC1               | $U_{in} = (16 - 60) \text{ VDC}$<br>$I_{in} = 2.0 \text{ A @ } 16 \text{ VDC}$<br>$P_{in} = 31.5 \text{ W @ } 16 \text{ VDC}$ |
| 2        | In / +DC2               |   |
| 3        | In / COM                |   |
| 4        | In / COM                |   |

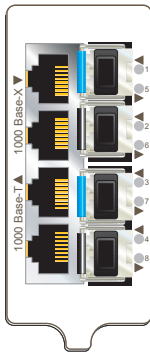
|                       |   |
|-----------------------|---|
| Degree of protection: | IP 40   |
| Ambient temperature:  | -40 °C to +70 °C                                      |
| Installation spacing: | Minimum 25 mm above/below<br>Minimum 10 mm left/right |

# Safety control drawing



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

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



| 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:<br>U = ± 1 V (4V/us)<br>I = ± 20 mA<br>Data rate:<br>100/1000 Mbit/s |
| 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   | PE                       |  |

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

\* Direction relative this unit!

# Declaration of Conformity



Westermo Teleindustri AB

## Declaration of conformity

The manufacturer Westermo Teleindustri AB  
SE-640 40 Stora Sundby, Sweden

Herewith declares that the product(s)

| Type of product            | Models <sup>1</sup>  |
|----------------------------|--|
| Industrial Ethernet Switch | RFI-x19-T3G-y, RFI-x11-T3G-y, RFI-x15-F4G-T3G-y,<br>RFI-x07-F4G-T3G-y, RFI-x19-F4G-T7G-y,<br>RFI-x11-F4G-T7G-y, RFI-x19-F4G-T7G-F8-y |

is in conformity with the following EC directive(s).

| No          | Short name   |
|-------------|--|
| 2004/108/EC | Electromagnetic Compatibility (EMC)  |
| 2011/65/EU  | Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) |

References of standards applied for this EC declaration of conformity.

| No           | Title  | Issue              |
|--------------|--|--------------------|
| EN 50121-4   | Railway applications – Electromagnetic compatibility – Emission and immunity of the signalling and telecommunications apparatus          | 2006               |
| EN 55022     | Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement                                 | 2010               |
| EN 55024     | Information technology equipment – Immunity characteristics Limits and methods of measurement  | 2010               |
| EN 61000-6-1 | Electromagnetic compatibility – Immunity for residential environments  | 2007               |
| EN 61000-6-2 | Electromagnetic compatibility – Immunity for industrial environments   | 2005<br>+ C1: 2005 |
| EN 61000-6-3 | Electromagnetic compatibility – Emission for residential environments  | 2007<br>+A1:2011   |
| EN 61000-6-4 | Electromagnetic compatibility – Emission for industrial environments   | 2007<br>+A1:2011   |
| EN 50581     | Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances | 2012               |

The last two digits of the year in which the CE marking was affixed: 15

Signature

Pierre Öberg  
Technical Manager  
25<sup>th</sup> Mars 2015

<sup>1</sup> Model Differences: x = 1 or 2 and indicates software version, y = optional and may indicate customer specific models.

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Corp. identity number  
556361-2604

Registered office  
Eskilstuna



## Type tests and environmental conditions

| 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   |
| Fast transient                 | EN 61000-4-4                 | Signal ports                              | ± 2 kV   |
|                                |                              | Power ports                               | ± 2 kV   |
| Surge                          | EN 61000-4-5                 | Signal ports                              | ± 2 kV line to earth, ± 1 kV line to line  |
|                                |                              | Power ports                               | ± 2 kV line to earth, ± 1 kV line to line  |
| RF conducted                   | EN 61000-4-6                 | Signal ports                              | 10 V 80% AM (1 kHz), 0.15 – 80 MHz   |
|                                |                              | Power 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   |
| Pulse magnetic field           | EN 61000-4-9                 | Enclosure                                 | 300 A/m  |
| Radiated emission              | CISPR 16-2-3                 | Enclosure                                 | Class B  |
|                                | ANSI C63.4 (FCC part 15)     | Enclosure                                 | Class B, 30 – 6500 MHz   |
| Conducted emission             | CISPR 16-2-1                 | DC power ports<br>Telecommunication ports | Class B  |
| Dielectric strength            | EN 60950                     | Signal port to other isolated ports       | 1.5 kVrms 50 Hz 1 min  |
|                                |                              | Power port to other isolated ports        | 1.5 kVrms 50 Hz 1 min  |
| Temperature                    | EN 60068-2-1<br>EN 60068-2-2 | Operating                                 | –40 to +70°C (all models)  |
|                                |                              | Storage & Transport                       | –40 to +85°C (all models)  |
|                                |                              | Maximum surface temperature               | 135 °C (temperature class T4)  |
| Humidity                       | EN 60068-2-27                | Operating                                 | 5 to 95% relative humidity   |
|                                |                              | Storage & 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<br>(Wall-mounted or DIN-rail mounted using TH 35-15 according to EN 60175) |
| Shock                          | IEC 60068-2-27               | Operating                                 | 15 g, 11 ms<br>(Wall-mounter or DIN-rail mounted using TH 35-15 according to EN 60175)                         |
| Enclosure                      | UL 94                        | Aluminium / Zink                          | Flammability class V-0 (all models)  |

## Description

The RedFox Industrial includes a collection of high performance industrial Ethernet switches with enhanced routing functionality designed to build cost effective, secure and reliable networks. The product range offers a number of Ethernet interface combinations, which gives you the ability to select the perfect routing switch for your application providing optimum functionality at the best value.

Advanced routing functions and firewall settings allow the RedFox to segregate networks and ensure that mission critical industrial networks are protected. The RedFox is also able to provide secure remote access to these networks across insecure connections by acting as a VPN endpoint.

## RedFox Industrial models

| Westermo article number | Denomination       | Description   |
|-------------------------|--------------------|---|
| 3641-4100               | RFI-219-T3G        | 3 x 10/100/1000 Mbit/s, Ethernet TX, RJ-45<br>16 x 10/100 Mbit/s, Ethernet TX, RJ-45  |
| 3641-4110               | RFI-211-T3G        | 3 x 10/100/1000 Mbit/s, Ethernet TX, RJ-45<br>8 x 10/100 Mbit/s, Ethernet TX, RJ-45   |
| 3641-4200               | RFI-215-F4G-T3G    | 3 x 10/100/1000 Mbit/s, Ethernet TX, RJ-45<br>8 x 10/100 Mbit/s, Ethernet TX, RJ-45<br>4 x 100/1000 Mbit/s, pluggable connections<br>transceivers supported, Ethernet FX or TX SFP  |
| 3641-4210               | RFI-207-F4G-T3G    | 3 x 10/100/1000 Mbit/s, Ethernet TX, RJ-45.<br>4 x 100/1000 Mbit/s, pluggable connections<br>transceivers supported, Ethernet FX or TX SFP  |
| 3641-4300               | RFI-219-F4G-T7G    | 7 x 10/100/1000 Mbit/s, Ethernet TX, RJ-45<br>4 x 100/1000 Mbit/s, pluggable connections<br>transceivers supported, Ethernet FX or TX SFP<br>8 x 10/100 Mbit/s, Ethernet TX, RJ-45  |
| 3641-4305               | RFI-119-F4G-T7G    | 7 x 10/100/1000 Mbit/s, Ethernet TX, RJ-45<br>4 x 100/1000 Mbit/s, pluggable connections<br>transceivers supported, Ethernet FX or TX SFP<br>8 x 10/100 Mbit/s, Ethernet TX, RJ-45  |
| 3641-4310               | RFI-211-F4G-T7G    | 7 x 10/100/1000 Mbit/s, Ethernet TX, RJ-45<br>4 x 100/1000 Mbit/s, pluggable connections<br>transceivers supported, Ethernet FX or TX SFP   |
| 3641-4315               | RFI-111-F4G-T7G    | 7 x 10/100/1000 Mbit/s, Ethernet TX, RJ-45<br>4 x 100/1000 Mbit/s, pluggable connections<br>transceivers supported, Ethernet FX or TX SFP   |
| 3641-4320               | RFI-219-F4G-T7G-F8 | 7 x 10/100/1000 Mbit/s, Ethernet TX, RJ-45<br>4 x 100/1000 Mbit/s, pluggable connections<br>transceivers supported, Ethernet FX or TX SFP<br>8 x 100 Mbit/s, pluggable connections transceivers<br>supported, Ethernet FX or TX SFP |

# Housing

## Description

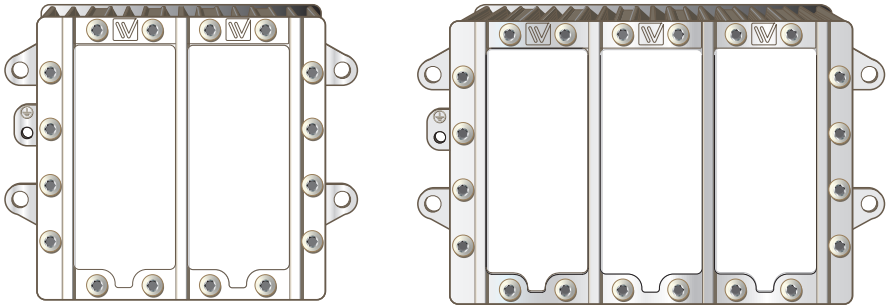
Depending on RedFox model, the size of the enclosure may vary. There are two sizes available, a two-slot housing and a three-slot housing.

Regardless of RedFox model, the slot on the far left will always be occupied by the power and CPU interface. Other slots vary depending on RedFox model.

The back end holds a casted DIN-clip for stable mounting on a DIN-rail. Direct wall-mount is also possible using the four brackets in each corner. The back end also holds the earth connection. For detailed ground connection information see section on Earth Connection.

## 2 and 3 slot enclosure

The slot on the left will always be occupied by the power and CPU. Other slots may vary depending on RedFox model.



## Specification

|                      | 2 slot enclosure                                | 3 slot enclosure                                |
|----------------------|---|---|
| Dimension W x H x D  | 134 x 105 x 122 mm<br>(without connectors)      | 175 x 105 x 122 mm<br>(without connectors)      |
| Weight               | 1.5 kg  | 2.2 kg  |
| Number of slots      | 2   | 3   |
| Degree of protection | IP40 according to EN 60529                      | IP40 according to EN 60529                      |
| Cooling              | Convection                                      | Convection                                      |
| Mounting             | Horizontal on 35 mm DIN-rail<br>or wall-mounted | Horizontal on 35 mm DIN-rail<br>or wall-mounted |

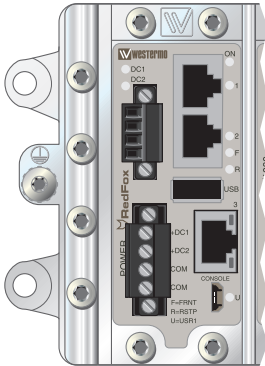
## Power and CPU module

### Description

Regardless of RedFox model, all units will be delivered with the power and CPU interface in the slot on the far left. The power and CPU module holds a power board and a CPU board. The isolated power supply has redundant power inputs and allows for a wide operating voltage range (see interface specification). The digital IO-port can be used for monitoring the unit (see Westermo OS management guide).

The CPU module holds several interfaces. Three RJ-45 connectors with support for Ethernet 1000BaseTX, a USB port for easy save/load of system configuration and a console port. 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](http://www.ftdichip.com) and download the appropriate VCP driver.

For detailed information on LED indicators, see section on LED indicators Power/CPU.



## Power and CPU

- ⌘ Redundant power supply and alarm function
- ⌘ Wide operating voltage range (16 VDC to 60 VDC)
- ⌘ Digital IO for monitoring
- ⌘ Console port for management using CLI
- ⌘ USB port for easy save and load system configuration
- ⌘ 3 x RJ-45 Ethernet 1000BaseTX connectors
- ⌘ Status LED's

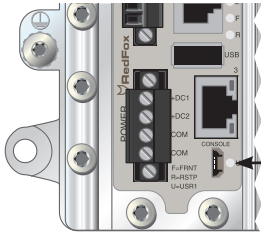
## Interface specifications

| Power and CPU         |   |
|-----------------------|---|
| Rated voltage         | 20 to 48 VDC                            |
| Operating voltage     | 16 to 60 VDC                            |
| Rated frequency       | DC                                      |
| Polarity              | Reverse polarity protected              |
| Redundant power input | Yes                                     |
| Isolation to          | All other                               |
| Connection            | Detachable screw terminal               |
| Connector size        | 0.2 – 2.5 mm <sup>2</sup> (AWG 24 – 12) |
| Shielded cable        | Not required                            |

| <b>Power</b>          |                    |  |
|-----------------------|--------------------|--|
| Rated voltage         |                    | 20 to 48 VDC                                       |
| Operating voltage     |                    | 16 to 60 VDC                                       |
| Rated current         | RFI-111-F4G-T7G    | 0.87 (1.06*) A @ 20 VDC<br>0.35 (0.43*) A @ 48 VDC |
|                       | RFI-119-F4G-T7G    | 0.93 (1.12*) A @ 20 VDC<br>0.38 (0.45*) A @ 48 VDC |
|                       | RFI-207-F4G-T3G    | 0.55 (0.72*) A @ 20 VDC<br>0.23 (0.29*) A @ 48 VDC |
|                       | RFI-211-F4G-T7G    | 0.87 (1.06*) A @ 20 VDC<br>0.35 (0.43*) A @ 48 VDC |
|                       | RFI-211-T3G        | 0.43 (0.60*) A @ 20 VDC<br>0.19 (0.25*) A @ 48 VDC |
|                       | RFI-215-F4G-T3G    | 0.63 (0.82*) A @ 20 VDC<br>0.26 (0.33*) A @ 48 VDC |
|                       | RFI-219-F4G-T7G    | 0.93 (1.12*) A @ 20 VDC<br>0.38 (0.45*) A @ 48 VDC |
|                       | RFI-219-F4G-T7G-F8 | 1.30 (1.47*) A @ 20 VDC<br>0.52 (0.58*) A @ 48 VDC |
|                       | RFI-219-T3G        | 0.63 (0.79*) A @ 20 VDC<br>0.26 (0.33*) A @ 48 VDC |
| Inrush current        |                    | 40 mA2s @ 20 VDC<br>257 mA2s @ 60 VDC              |
| Startup current**     |                    | 2x Rated current                                   |
| Rated frequency       |                    | DC   |
| Polarity              |                    | Reverse polarity protected                         |
| Redundant power input |                    | Yes  |
| Isolation to          |                    | All other  |
| Connection            |                    | Detachable   |
| Connector size        |                    | 0.2 - 2.5 mm2 (AWG 24 - 12)                        |
| Shielded cable        |                    | Not required                                       |

\* With 500mA USB load

\*\* External supply current capability for proper start-up



### Connection to console port

The console port 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](http://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 |

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

| <b>IO / Relay output</b> |   |
|--------------------------|---|
| Connect resistance       | 30 $\Omega$                             |
| Isolation to             | All other                               |
| Connection               | Detachable screw terminal               |
| Connector size           | 0.2 – 2.5 mm <sup>2</sup> (AWG 24 – 12) |
| Maximum voltage/current  | 60 VDC / 80 mA                          |

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

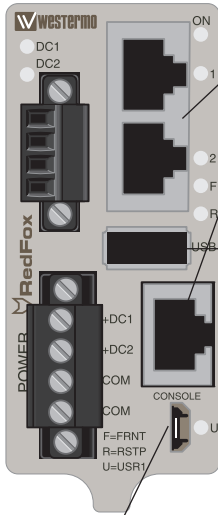
| <b>Ethernet TX</b>       |  |
|--------------------------|--|
| Electrical specification | IEEE std 802.3. 2005 Edition   |
| Data rate                | 10 Mbit/s, 100 Mbit/s, 1000 Mbit/s, manual or auto   |
| Duplex                   | Full or half, manual or auto   |
| Circuit type             | 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  |
| Number of ports          | 3  |

\* **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 protective earth. Refer also to "Safety" section.





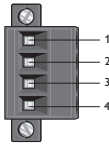
Console  
(see more information  
on page 13)

| 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 PE |

| Position | Direction* | Description     |
|----------|------------|-----------------|
| 1        | Out        | VBUS            |
| 2        | In/Out     | D-              |
| 3        | In/Out     | D+              |
| 4        | Out        | GND             |
| Shield   | In/Out     | Connected to PE |

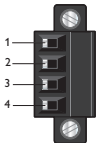
\* Direction relative this unit.

## Power connection

|  | 4-position | Product marking | Direction | Description              |
|---|------------|-----------------|-----------|--------------------------|
|   | No. 1      | +DC1            | Input     | Supply voltage input DC1 |
|   | No. 2      | +DC2            | Input     | Supply voltage input DC2 |
|   | No. 3      | -COM            | Input     | Common                   |
|   | No. 4      | -COM            | Input     | Common                   |

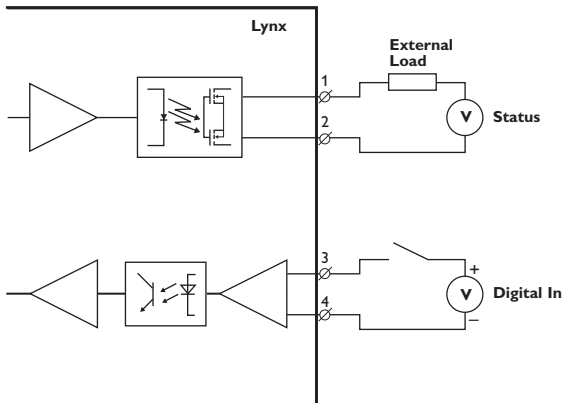
Lynx supports redundant power connection. The positive inputs are +DC1 and +DC2, the negative input for both supplies are -COM. Connect the primary voltage (e.g. +24VDC) to the +DC1 pin and return to one of the -COM pins on the power input.

## I/O connection

|  | 4-position | Product marking | Direction | Description                  |
|---|------------|-----------------|-----------|------------------------------|
|   | No. 1      | Status +        | Output    | Alarm relay (status) contact |
|   | No. 2      | Status -        | Output    | Alarm relay (status) contact |
|   | No. 3      | Digital In +    | Input     | Digital In +                 |
|   | No. 4      | Digital In -    | Input     | Digital In -                 |

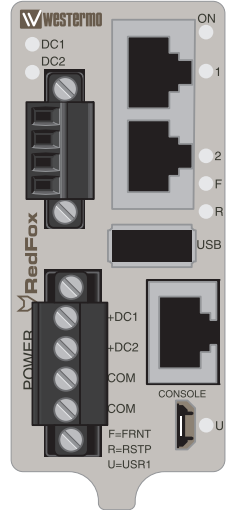
The Status output is a potential free, opto-isolated normally closed solid-state relay. This can be configured to monitor various alarm events within the Lynx unit, see WeOS Management Guide. An external load in series with an external voltage source is required for proper functionality. For voltage/current ratings, see Interface Specification section.

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



# 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, see "WeOS Management Guide"). |
|                  | 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  |
| 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             | <i>Configurable, see WeOS Management Guide</i> |  |
| Copper ports 1-3 | OFF  | No link.   |
|                  | GREEN  | Link established.  |
|                  | GREEN FLASH                                    | Data traffic indication.   |
|                  | YELLOW   | Port alarm and no link. Or if FRNT, RSTP or Link Aggregation mode, port is blocked.                              |



## Interface modules

### 8 copper ports

All ports support category 5e cable or better and can handle cable lengths up to 150 m (492 ft).

### Interface specifications

| 8 copper ports           |  |
|--------------------------|--|
| Electrical specification | IEEE std 802.3. 2005 Edition   |
| Data rate                | 10 Mbit/s or 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  |
| Number of ports          | 8  |

\* **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.

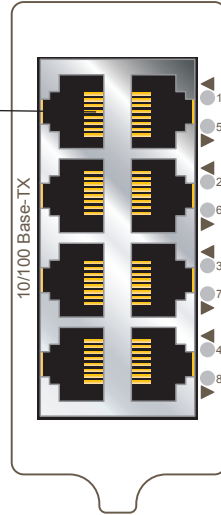
The cable shield should be properly connected (360°) to an earthing point within 1 m from this port. This earthing point should have a low impedance connection to the conductive enclosure of the apparatus cabinet, or similar, where the unit is built-in. This conductive enclosure should be connected to the earthing system of an installation and may be directly connected to the protective earth. Refer also to "Safety" section.

## LED indicators 8 copper ports

| LED                | Status      | Description   |
|--------------------|-------------|---|
| Copper ports 1 – 8 | OFF         | No link.  |
|                    | GREEN       | Link established.   |
|                    | GREEN FLASH | Data traffic indication.  |
|                    | YELLOW      | Port alarm and no link. Or if FRNT, RSTP or Link Aggregation mode, port is blocked. |

| Position | Direction* | Description     |
|----------|------------|-----------------|
| 1        | In/Out     | TD+             |
| 2        | In/Out     | TD-             |
| 3        | In/Out     | RD+             |
| 4        | -          | Not connected   |
| 5        | -          | Not connected   |
| 6        | In/Out     | RD-             |
| 7        | -          | Not connected   |
| 8        | -          | Not connected   |
| Shield   | In/Out     | Connected to PE |

\* Direction relative this unit.



## F4G, 4 SFP slots

The F4G interface has four SFP slots supporting Ethernet 10/100/1000BaseFX/X. Each slot can hold one SFP transceiver for copper or fibre cable. For supported transceivers see SFP transceivers user guide (art no. 6100-0000) available at [www.westermo.com](http://www.westermo.com).

### Interface specifications

| F4G                              |  |
|----------------------------------|--|
| Optical/Electrical specification | IEEE std 802.3. 2005 Edition                             |
| Data rate                        | 10, 100 or 1000 Mbit/s*                                  |
| Duplex                           | Full or half, manual or auto                             |
| Transmission range               | Depending on transceiver                                 |
| Connection                       | SFP slot holding fibre transceiver or copper transceiver |
| Number of ports                  | 4  |

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

## F8, 8 SFP slots

The F8 interface has eight SFP slots supporting Ethernet 10/100BaseFX. Each slot can hold one SFP transceiver for copper or fibre cable. For supported transceivers see SFP transceivers user guide (art no. 6100-0000) available at [www.westermo.com](http://www.westermo.com).

### Interface specifications

| F8                               |  |
|----------------------------------|--|
| Optical/Electrical specification | IEEE std 802.3. 2005 Edition                             |
| Data rate                        | 10 or 1000 Mbit/s*                                       |
| Duplex                           | Full or half, manual or auto                             |
| Transmission range               | Depending on transceiver                                 |
| Connection                       | SFP slot holding fibre transceiver or copper transceiver |
| Number of ports                  | 8  |

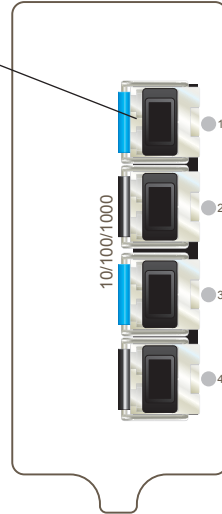
\* 10 Mbit/s or 100 Mbit/s transceiver supported.

## LED indicators F4G

| LED               | Status      | Description   |
|-------------------|-------------|---|
| Fibre ports 1 – 4 | OFF         | No link.  |
|                   | GREEN       | Link established.   |
|                   | GREEN FLASH | Data traffic indication.  |
|                   | YELLOW      | Port alarm and no link. Or if FRNT, RSTP or Link Aggregation mode, port is blocked. |

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

\* Direction relative this unit.

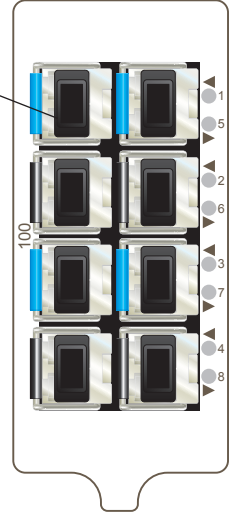


## LED indicators F8

| LED               | Status      | Description   |
|-------------------|-------------|---|
| Fibre ports 1 – 8 | OFF         | No link.  |
|                   | GREEN       | Link established.   |
|                   | GREEN FLASH | Data traffic indication.  |
|                   | YELLOW      | Port alarm and no link. Or if FRNT, RSTP or Link Aggregation mode, port is blocked. |

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

\* Direction relative this unit.





## F4G-T4G, 4 SFP slots and 4 Gbit copper ports

The F4G-T4G interface has four SFP slots supporting Ethernet BaseFX/X and four RJ-45 connectors supporting Ethernet 10/100/1000BaseTX/T. Each SFP slot can hold one SFP transceiver for copper or fibre cable. Fibre transceiver distances range from 550 m (0.34 mi) to 120 km (74,6 mi).

For supported transceivers see section on SFP transceivers.

All ports support category 5e cable or better and can handle cable lengths up to 150 m (492 ft).

### Interface specifications

| F4G-T4G                    |   |
|----------------------------|---|
| Fixed copper ports (RJ-45) |   |
| Electrical specification   | IEEE std 802.3. 2005 Edition  |
| Data rate                  | 10, 100 or 1000 Mbit/s  |
| 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 signalling and telecommunications apparatus and located close to rails* |
| Conductive housing         | Yes   |
| Number of ports            | 4   |

\* **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 protective earth. Refer also to "Safety" section.

| SFP ports                        |  |
|----------------------------------|--|
| Optical/Electrical specification | IEEE std 802.3. 2005 Edition                             |
| Data rate                        | 10, 100 or 1000 Mbit/s*                                  |
| Duplex                           | Full or half, manual or auto                             |
| Transmission range               | Depending on transceiver                                 |
| Connection                       | SFP slot holding fibre transceiver or copper transceiver |
| Number of ports                  | 4  |

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

## LED indicators F4G-T4G

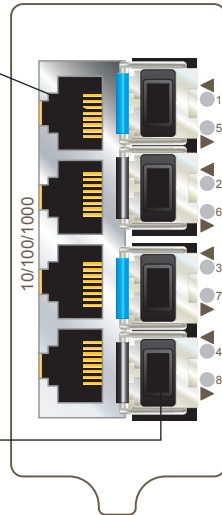
| LED                                     | Status      | Description   |
|---|-------------|---|
| Copper ports 1 – 4<br>Fibre ports 5 – 8 | OFF         | No link.  |
|   | GREEN       | Link established.   |
|   | GREEN FLASH | Data traffic indication.  |
|   | YELLOW      | Port alarm and no link. Or if FRNT, RSTP or Link Aggregation mode, port is blocked. |

| 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 PE |

\* Direction relative this unit

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

\* Direction relative this unit.



## SFP Transceivers

See SFP Transceivers User Guide 6100-0000 for supported SFP transceivers.

Note: The unit supports Westermo labelled transceivers only.

### Deviations

With *copper transceiver* 1100-0148 the specified operating temperature on the RFI-series is 0 to 50°C.

FRNT reconfiguration times can not be guaranteed with copper transceivers.

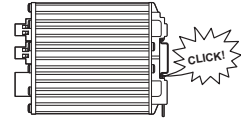
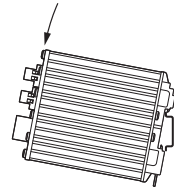


## Mounting

### Mounting, 35 mm DIN-rail

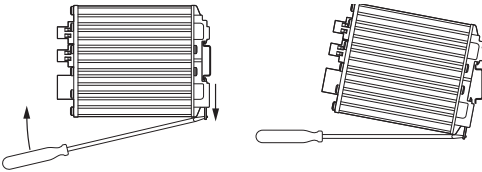
The unit can be mounted on a 35 mm DIN-rail, which is horizontally mounted inside an apparatus cabinet, or similar. Snap on mounting, see figure.

**Note!** For proper vibration and chock performance Westermo recommends standard top-hat DIN-rail TH 35-15 according to EN 60715.



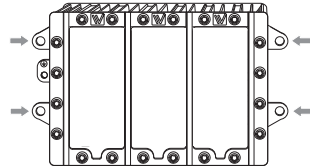
### Removal

Press down the support at the back of the unit using a screwdriver. See figure.



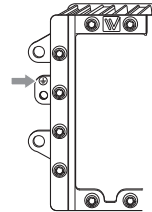
### Wall mounting

This unit can also be wall-mounted, see figure.



### Earth connection

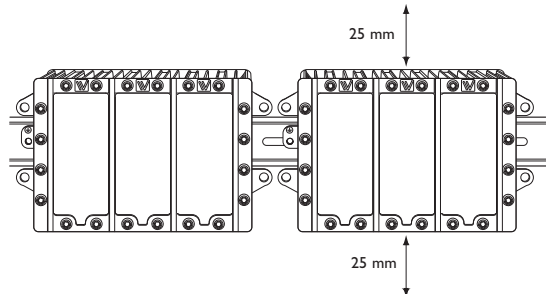
For correct function the ground connection on the unit needs to be properly connected to a solid ground. See figure.



### Cooling

This unit uses convection cooling. To avoid obstructing the airflow around the unit, use the following spacing rules. Minimum spacing 25 mm (1.0 inch) above /below and 10 mm (0.4 inches) left /right the unit.

Spacing is recommended for the use of unit in full operating temperature range and service life. See figure.



## Getting Started

This product runs Westermo Operating System (WeOS) which provides several management tools that can be used for configuration of the unit.

- **WeConfig**  
WeConfig 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 WeOS management guide.

|                 |                    |                                 |
|-----------------|--------------------|---------------------------------|
| Factory default | <i>IP address:</i> | 192.168.2.200 (and DHCP client) |
|                 | <i>Netmask:</i>    | 255.255.255.0                   |
|                 | <i>Gateway:</i>    | Disabled                        |

**Note!** If you are not sure about the subnet – consult your network administrator.

## Configuration

### Configure the unit via Webbrowser

The unit can easily be configured via a Web browser.

Open the link <http://192.168.2.200> 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:* westermo

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.

## Referring documents

| Type             | Description                  | Document number |
|------------------|------------------------------|-----------------|
| Management Guide | Westermo OS management guide | 6101-3201       |

## Cable factory reset on RedFox Industrial

It is possible to set the unit to factory default settings by using a standard (straight) Ethernet RJ-45 cable.

1. Power off the switch and disconnect all Ethernet cables (including 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 leftmost slot by an Ethernet cable). The ports need to be connected directly by an Ethernet cable, i.e., not via a hub or switch. Use a straight cable - not a cross-over cables - 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.
  - Go ahead 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 the unit will restart with factory default settings.
  - Note! Do not power off the unit while the factory reset process is in progress. 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 cable. The switch will conduct a normal boot with the existing settings.





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## Sales Units

### Westermo Data Communications

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