



# Lynx L110-F2G & L210-F2G

Industrial Ethernet 10-Port Switch



# Table of Contents

|                                                        |    |
|--------------------------------------------------------|----|
| 1. General Information .....                           | 4  |
| 1.1. Legal Information .....                           | 4  |
| 1.2. About This Guide .....                            | 4  |
| 1.3. Software Tools .....                              | 4  |
| 1.4. License and Copyright for Included FLOSS .....    | 4  |
| 1.5. WeOS Management Guide .....                       | 4  |
| 2. Safety and Regulations .....                        | 5  |
| 2.1. Warning Levels .....                              | 5  |
| 2.2. Safety Information .....                          | 6  |
| 2.3. Care Recommendations .....                        | 8  |
| 2.4. Product Disposal .....                            | 8  |
| 2.5. Compliance Information .....                      | 9  |
| 2.5.1. Agency Approvals and Standards Compliance ..... | 9  |
| 2.5.2. UL 62368-1 Notice .....                         | 9  |
| 2.5.3. UL 62368-1 DC Mains Notice .....                | 9  |
| 2.5.4. FCC Part 15.105 Class A Notice .....            | 10 |
| 2.5.5. AREMA .....                                     | 10 |
| 2.5.6. Corrosive Environment .....                     | 11 |
| 2.5.7. Simplified Declaration of Conformity .....      | 12 |
| 3. Product Description .....                           | 13 |
| 3.1. Product Description .....                         | 13 |
| 3.2. Available Models .....                            | 13 |
| 3.3. Hardware Overview .....                           | 14 |
| 3.4. Connector Information .....                       | 15 |
| 3.4.1. Ethernet Connection TX .....                    | 15 |
| 3.4.2. Power Input .....                               | 16 |
| 3.4.3. I/O Connection .....                            | 16 |
| 3.4.4. Connection to the Console Port .....            | 17 |
| 3.5. LED Indicators .....                              | 18 |
| 3.6. SFP Transceivers .....                            | 18 |
| 3.7. Supported Transceivers .....                      | 19 |
| 3.8. Deviations .....                                  | 19 |
| 3.9. Dimensions .....                                  | 20 |
| 4. Installation .....                                  | 21 |
| 4.1. Mounting .....                                    | 21 |
| 4.2. Removal of Product .....                          | 21 |
| 4.3. Cooling .....                                     | 22 |
| 4.4. Getting Started .....                             | 22 |
| 4.5. Configuration Via a Web Browser .....             | 23 |
| 4.6. Factory Default .....                             | 23 |
| 5. Specifications .....                                | 25 |
| 5.1. Interface Specifications .....                    | 25 |

|                                                    |    |
|----------------------------------------------------|----|
| 5.2. Type Tests and Environmental Conditions ..... | 28 |
| 6. Revision Notes .....                            | 31 |

# 1. General Information

## 1.1. Legal Information

The contents of this document are provided “as is”. Except as required by applicable law, no warranties of any kind are made in relation to the accuracy and reliability or contents of this document, either expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. 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 [www.westermo.com](http://www.westermo.com).

## 1.2. About This Guide

This guide is intended for installation engineers and users of the Westermo products.

It includes information on safety and regulations, a product description, installation instructions and technical specifications.

## 1.3. Software Tools

Related software tools are available at <https://www.westermo.com/support/product-support>.

## 1.4. License and Copyright for Included FLOSS

This product includes software developed by third parties, including Free/Libre Open Source Software (FLOSS). The specific license terms and copyright associated with the software are included in each software package respectively. Please visit the product web page for more information.

Upon request, the applicable source code will be provided. A nominal fee may be charged to cover shipping and media. Please direct any source code request to your normal sales or support channel.

## 1.5. WeOS Management Guide

This product runs WeOS 4 (Westermo Operating System). Instructions for quick start, configuration, factory reset and use of USB port are found in the WeOS Management Guide at [www.westermo.com](http://www.westermo.com).

## 2. Safety and Regulations

### 2.1. Warning Levels

Warning signs are provided to prevent personal injuries and/or damages to the product. The following levels are used:

| Level of warning                                                                             | Description                                                                                 | Consequence personal injury    | Consequence material damage    |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------|--------------------------------|
| <br>WARNING | Indicates a potentially hazardous situation                                                 | Possible death or major injury | Major damage to the product    |
| <br>CAUTION | Indicates a potentially hazardous situation                                                 | Minor or moderate injury       | Moderate damage to the product |
| <br>NOTICE  | Provides information in order to avoid misuse of the product, confusion or misunderstanding | No personal injury             | Minor damage to the product    |
| <br>NOTE  | Used for highlighting general, but important information                                    | No personal injury             | Minor damage to the product    |

Table 1. Warning levels

## 2.2. Safety Information

### Before installation:

Read this manual completely and gather all information available on the product. Make sure it is fully understood. Check that your application does not exceed the safe operating specifications for the product.



#### **SAFETY DURING INSTALLATION**

The product must be installed and operated by qualified service personnel and installed into an apparatus cabinet or similar, where access is restricted to service personnel only.

Refer to chapter Compliance Information to see the required level of qualified service personnel according to safety standards.

Before energising and connecting communication cables to the product, ensure a protective earthing conductor is first connected to the protective earthing terminal (only valid for metallic housings). Westermo recommends a cross-sectional area of at least 4 mm<sup>2</sup>.

If the product does not have a protective earthing terminal, then the DIN-rail must be connected to protective earth.

Upon removal of the product, disconnect the product from the power supply and all other communication ports before disconnecting the protective earthing conductor.



#### **HAZARDOUS VOLTAGE**

Do not open an energised product. Hazardous voltage may occur when connected to a power supply.



#### **PROTECTIVE FUSE**

It must be possible to disconnect manually from the power supply. Ensure compliance to national installation regulations.

Replacing the internal fuse must only be performed by Westermo qualified personnel.



#### **POWER SUPPLY CONNECTION**

There are safety regulations governing the power source that can be used in conjunction with the product. Refer to chapter Interface Specifications.



### **REDUCE THE RISK OF FIRE**

To reduce the risk of fire, use only telecommunication line cords with a cable diameter of AWG 26 or larger. Regarding power cable dimensions, see chapter Interface Specifications.



### **CLASS 1 LASER PRODUCT**

Do not look directly into a fibre optical port or any connected fibre, although the product is designed to meet the Class 1 Laser regulations and complies with 21 CFR 1040.10 and 1040.11.



### **HANDLING OF SFP TRANSCEIVERS**

SFP transceivers are supplied with plugs to avoid contamination inside the optical port. They are very sensitive to dust and dirt. If the fibre optic cable is disconnected from the product, a protective plug must be used on the transmitter/receiver. The protective plug must be kept on during transportation. The fibre optic cable must be handled the same way.



### **CORROSIVE GASES**

If the product is placed in a corrosive environment, it is important that all unused connector sockets are protected with a suitable plug, in order to avoid corrosion attacks on the gold plated connector pins.



### **ELECTROSTATIC DISCHARGE (ESD)**

Prevent electrostatic discharge damage to internal electronic parts by discharging your body to a grounding point (e.g. use a wrist strap).



### **HOT SURFACE**

Be aware that the surface of this product may become hot. When it is operated at high temperatures, the external surface may exceed Touch Temperature Limit according to the product's relevant electrical safety standard.

### 2.3. Care Recommendations

Follow the care recommendations below to maintain full operation of the product and to fulfill the warranty obligations:

- Do not drop, knock or shake the product. Rough handling above the specification may cause damage to internal circuit boards.
- Use a dry or slightly water-damp cloth to clean the product. Do not use harsh chemicals, cleaning solvents or strong detergents.
- Do not paint the product. Paint can clog the product and prevent proper operation.

If the product is used in a manner not according to specification, the protection provided by the equipment may be impaired.

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

### 2.4. Product Disposal

This symbol means that the product shall not be treated as unsorted municipal waste when disposing of it. It needs to be handed over to an applicable collection point for recycling electrical and electronic equipment.

By ensuring the product is disposed of correctly, you will help to reduce hazardous substances and prevent potential negative consequences to both the environment and human health, which could be caused by inappropriate disposal.



Figure 1. WEEE symbol for treatment of product disposal

## 2.5. Compliance Information

### 2.5.1. Agency Approvals and Standards Compliance

| Type          | Approval/Compliance                                                                                                                                                                                                                                                                                                   |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMC           | <ul style="list-style-type: none"><li>• EN/IEC 61000-6-1, Immunity residential environments</li><li>• EN/IEC 61000-6-2, Immunity industrial environments</li><li>• EN/IEC 61000-6-4, Emission industrial environments</li><li>• EN 50121-4/IEC 62236-4, Railway signalling and telecommunications apparatus</li></ul> |
| Environmental | <ul style="list-style-type: none"><li>• NEMA TS 2, Traffic Controller Assemblies with NTCIP Requirements<sup>a</sup>.</li></ul>                                                                                                                                                                                       |
| Safety        | <ul style="list-style-type: none"><li>• UL 62368-1, Safety Communication Technology</li></ul>                                                                                                                                                                                                                         |
| Marine        | <ul style="list-style-type: none"><li>• DNV GL rules for classification - Ships and offshore units<sup>b</sup>.</li></ul>                                                                                                                                                                                             |

<sup>a</sup>Valid for Lx10-F2G-12VDC

<sup>b</sup>Valid for Lx10-F2G

*Table 2. Agency approvals and standards compliance*

### 2.5.2. UL 62368-1 Notice

This product has been tested and found compliant to UL 62368-1, Safety for Communication Technology. In accordance with the definitions of the standard, this product shall be handled by instructed personnel. Energy source classifications are according to following:

|                          |               |            |
|--------------------------|---------------|------------|
| Electrical energy source | Power port    | ES1        |
|                          | Serial port   | ES1        |
|                          | Ethernet port | ES1, TNV-1 |
|                          | I/O port      | ES1        |
| Power source             | Power port    | PS3        |
| Thermal energy source    | Enclosure     | TS1        |
| Mechanical energy source | Enclosure     | MS1        |
| Radiation energy source  | SFP           | RS1        |

*Table 3. UL 62368-1 notice*

### 2.5.3. UL 62368-1 DC Mains Notice

In accordance with UL 62368-1, Annex DVD and DVH then Westermo does not recommend using the mechanical enclosure/chassis (PE) as a conductive part of the sourced earthed DC power system in a DC mains distribution networks. If so, the transient protective barriers are compromised, and the product will not be compliant to evaluated standards and immunity performance according to type test table in the user guide.

The earthing electrodes shall be located at the source in the DC distribution system and separate earth and protective earth conductors shall be provided throughout the system.

The field wiring shall be sufficient fixated and the protective cap for the power connector, which is supplied with the product, shall be used on DC voltages higher than 60 VDC.

#### 2.5.4. FCC Part 15.105 Class A Notice

This product 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 product is operated in a commercial environment.

This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user manual, may cause harmful interference to radio communications. Operation of this product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the users own expense.

#### 2.5.5. AREMA

L110-F2G-12VDC has been tested according to AREMA Part 11.3.3, 11.5.1 and 11.5.2.

| Port     | Test                   | Remark                                                      |
|----------|------------------------|-------------------------------------------------------------|
| DC Power | $3 \times U_N$ , 80 ms | $U_N$ (max)=24 VDC when powered from a vital signal battery |

Table 4. AREMA Part 11.3.3 C.4. - Signal equipment surge withstand capability for DC input port

|                     | Class C | Class D | Class E | Remarks                  |
|---------------------|---------|---------|---------|--------------------------|
| Temperature         | ×       | ×       | ×       |                          |
| Relative humidity   | ×       | ×       | ×       |                          |
| Vibration           | ×       | ×       | ×       |                          |
| Mechanical shock    | ×       | ×       | ×       |                          |
| Dielectric strength |         |         | ×       | Tested with 1.5 kVAC rms |

Table 5. AREMA Part 11.5.1. - Environmental Class

|                                | External | Internal |
|--------------------------------|----------|----------|
| <b>Enclosure port</b>          |          |          |
| Radiated RF immunity           | X        | X        |
| Power Frequency Magnetic Field | X        | X        |
| Pulse Magnetic Field           | X        | X        |
| <b>DC power port</b>           |          |          |
| EFT/Burst                      | X        | X        |
| Surge (1.2/50µs)               | -        | X        |
| Conducted RF                   | X        | X        |
| <b>DI-, DO-port</b>            |          |          |
| EFT/Burst                      | X        | X        |
| Surge (1.2/50µs)               | -        | X        |
| Conducted RF                   | X        | X        |
| <b>Ethernet ports</b>          |          |          |
| EFT/Burst                      | X        | X        |
| Surge (1.2/50µs)               | X        | X        |
| Conducted RF                   | X        | X        |
| <b>Serial ports</b>            |          |          |
| EFT/Burst                      | X        | X        |
| Surge (1.2/50µs)               | X        | X        |
| Conducted RF                   | X        | X        |

Table 6. AREMA Part 11.5.2. - Exposure Class

#### AREMA Part 11.3.3.E. - Equipment surge withstand documentation DC power port

1. Maximum normal circuit voltage when powered from a vital signal battery is 24 VDC
2. Surge protection clamping voltage is 58.1 VDC
3. Maximum energy handling capability is 2 J, 1 ms

#### 2.5.6. Corrosive Environment

This product has been successfully tested in a corrosion test according to IEC 60068-2-60, method 3. This means that the product meets the requirements to be placed in an environment classified as ISA-S71.04 class G3.



#### **CORROSIVE GASES**

If the product is placed in a corrosive environment, it is important that all unused connector sockets are protected with a suitable plug, in order to avoid corrosion attacks on the gold plated connector pins.

### 2.5.7. Simplified Declaration of Conformity

Hereby, Westermo declares that this product is in compliance with applicable EU directives and UK legislations. The full declaration of conformity and other detailed information is available at [www.westermo.com/support/product-support](http://www.westermo.com/support/product-support).



*Figure 2. The European Conformity and the UK Conformity Assessment markings*

## 3. Product Description

### 3.1. Product Description

The Lynx series consists of layer 2 or layer 3 industrial Ethernet switches, powered by WeOS, the Westermo network operating system. The Lynx switches are the most compact switches or device servers on the market, available with various ports depending on model, whereof two are 100 Mbit or Gbit SFP transceivers.

The Lynx series is designed for simple use in industrial applications, from the robust DIN rail clip solution to the configurable fault contact and the industrial level of dual power inputs.

Only industrial grade components are used which ensures a long service life. A wide operating temperature range of -40 to +74°C (-40 to +165°F) can be achieved with no moving parts or cooling holes in the case.

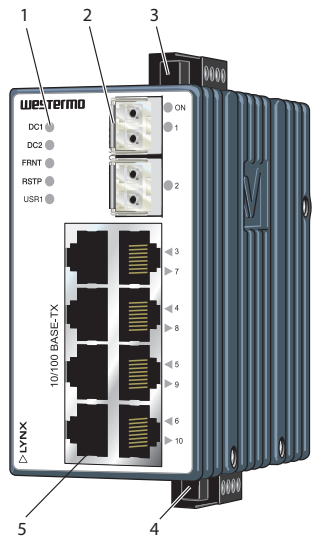
The Lynx series has been tested both by Westermo and external test institutes to meet many EMC, isolation, vibration and shock standards, all to the highest levels suitable for heavy industrial environments and rail trackside applications.

WeOS has been developed by Westermo to offer cross platform and future proof solutions. WeOS delivers unique functionality in legacy IP solutions, supporting Modbus Gateway, virtual COM, modem replacement or several options in dual TCP applications. For more WeOS functionality, please see the WeOS datasheet.

### 3.2. Available Models

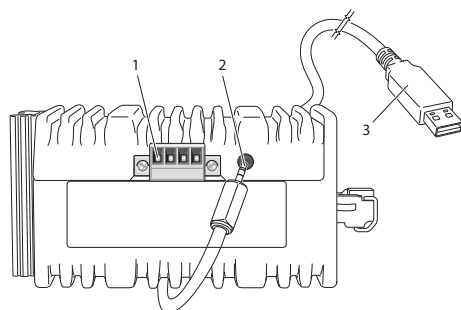
| Art. no.  | Model          | 100 Mbit<br>TX ports | Gbit SFP<br>ports | Serial<br>ports | SW | Rated voltage |
|-----------|----------------|----------------------|-------------------|-----------------|----|---------------|
| 3643-0100 | L110-F2G       | 8                    | 2                 | -               | L2 | 24-48 VDC     |
| 3643-0110 | L110-F2G-12VDC | 8                    | 2                 | -               | L2 | 12-48 VDC     |
| 3643-0105 | L210-F2G       | 8                    | 2                 | -               | L3 | 24-48 VDC     |

3.3. Hardware Overview



| No. | Description            | No. | Description      |
|-----|------------------------|-----|------------------|
| 1   | LED indicators         | 2   | SFP transceivers |
| 3   | Power connection       | 4   | I/O connection   |
| 5   | Ethernet connection TX |     |                  |

Figure 3. Location of interface ports and LED indicators



| No. | Description                          | No. | Description  |
|-----|--------------------------------------|-----|--------------|
| 1   | I/O connection                       | 2   | Console port |
| 3   | Accessorie cable, art. no. 1211-2027 |     |              |

Figure 4. Location of interface ports, bottom view

### 3.4. Connector Information

#### 3.4.1. Ethernet Connection TX

| Illustration                                                                      | Pin no. | Signal | Direction | Description               |
|-----------------------------------------------------------------------------------|---------|--------|-----------|---------------------------|
|  | 1       | TD+    | In/Out    | Transmitted/Received data |
|                                                                                   | 2       | TD-    | In/Out    | Transmitted/Received data |
|                                                                                   | 3       | RD+    | In/Out    | Transmitted/Received data |
|                                                                                   | 4       | -      | -         | Not connected             |
|                                                                                   | 5       | -      | -         | Not connected             |
|                                                                                   | 6       | RD-    | In/Out    | Transmitted/Received data |
|                                                                                   | 7       | -      | -         | Not connected             |
|                                                                                   | 8       | -      | -         | Not connected             |
|                                                                                   | Shield  |        |           | Connected to PE           |

Table 7. Ethernet connection TX

3.4.2. Power Input

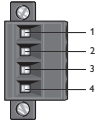
| Illustration                                                                      | Position | Product marking | Direction | Description    |
|-----------------------------------------------------------------------------------|----------|-----------------|-----------|----------------|
|  | 1        | +DC1            | Input     | Supply voltage |
|                                                                                   | 2        | +DC2            | Input     | Supply voltage |
|                                                                                   | 3        | -COM            | Input     | Common         |
|                                                                                   | 4        | -COM            | Input     | Common         |

Table 8. Power input

The product 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. +24 VDC) to the +DC1 pin and return to one of the -COM pins on the power input.

3.4.3. I/O Connection

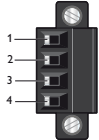
| Illustration                                                                      | Pin no. | Product marking | Direction | Description                  |
|-----------------------------------------------------------------------------------|---------|-----------------|-----------|------------------------------|
|  | 1       | Status +        | Output    | Status relay contact (alarm) |
|                                                                                   | 2       | Status -        | Output    | Status relay contact (alarm) |
|                                                                                   | 3       | Digital in +    | Input     | Digital in +                 |
|                                                                                   | 4       | Digital in -    | Input     | Digital in -                 |

Table 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 unit, see *WeOS Management Guide*. An external load in series with an external voltage source is required for proper functionality. For voltage/current, see Interface Specifications.

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

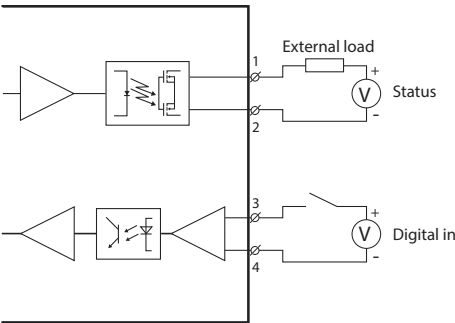


Figure 5. Digital in

### 3.4.4. Connection to the Console Port

The console port can be used to connect to the CLI (Command Line Interface).

1. Connect the serial diagnostic cable to the console port (use only Westermo cable 1211-2027).
2. Connect cable to your computer (USB port, if drivers are needed they can be downloaded from the Westermo web).
3. Use a terminal emulator and connect with correct speed and format (115200, 8N1) to the assigned port.

For more information about the CLI, see the WeOS Management guide.

| Accessories            |           |
|------------------------|-----------|
| Description            | Art. no.  |
| Westermo console cable | 1211-2027 |
| RJ45 to DB9 cable      | 1211-2210 |

*Table 10. Accessories table*

### 3.5. LED Indicators

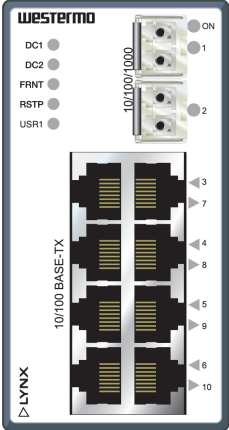
| LED              | Status                                          | Description                                                                                                                                                                     | Illustration                                                                       |
|------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| ON               | OFF                                             | Product has no power                                                                                                                                                            |  |
|                  | GREEN                                           | All OK, no alarm condition                                                                                                                                                      |                                                                                    |
|                  | GREEN BLINK                                     | Location indicator ("Here I am!"). Activated when connected to WeConfig tool, or upon request from web or/and CLI. RED BLINK during boot indicates pending cable factory reset. |                                                                                    |
|                  | RED                                             | Alarm condition, or until product has started up. (Alarm conditions are configurable, see <i>WeOS4 Management Guide</i> )                                                       |                                                                                    |
| DC1              | OFF                                             | Product has no power                                                                                                                                                            |                                                                                    |
|                  | GREEN                                           | Power OK on DC1                                                                                                                                                                 |                                                                                    |
|                  | RED                                             | Power failure on DC1                                                                                                                                                            |                                                                                    |
| DC2              | OFF                                             | Product has no power                                                                                                                                                            |                                                                                    |
|                  | GREEN                                           | Voltage present on DC2                                                                                                                                                          |                                                                                    |
|                  | RED                                             | Power failure on DC2                                                                                                                                                            |                                                                                    |
| FRNT             | OFF                                             | FRNT disabled                                                                                                                                                                   |                                                                                    |
|                  | GREEN                                           | FRNT OK                                                                                                                                                                         |                                                                                    |
|                  | RED                                             | FRNT error                                                                                                                                                                      |                                                                                    |
|                  | BLINK                                           | Product configured as FRNT focal point                                                                                                                                          |                                                                                    |
| RSTP             | OFF                                             | RSTP disabled                                                                                                                                                                   |                                                                                    |
|                  | GREEN                                           | RSTP enabled                                                                                                                                                                    |                                                                                    |
|                  | BLINK                                           | Product selected as RSTP/STP root switch                                                                                                                                        |                                                                                    |
| USR1             | Configurable, see <i>WeOS4 Management Guide</i> |                                                                                                                                                                                 |                                                                                    |
| Ethernet 1 to 10 | OFF                                             | No link                                                                                                                                                                         |                                                                                    |
|                  | GREEN                                           | Link established                                                                                                                                                                |                                                                                    |
|                  | GREEN FLASH                                     | Data traffic indication                                                                                                                                                         |                                                                                    |
|                  | YELLOW                                          | Port alarm, or port is set in blocking state by link redundancy protocol                                                                                                        |                                                                                    |

Table 11. LED indicators

### 3.6. SFP Transceivers

The product supports UL and IEC certified transceivers only. See Westermo's modular transceivers datasheets 100 Mbit and 1 Gbit for supported SFP transceivers, which can be downloaded from the product support pages at [www.westermo.com/support/product-support](http://www.westermo.com/support/product-support).

Each SFP slot can hold one SFP transceiver. See "*Transceiver User Guide 6100-0000*" for transceiver handling instructions, which also can be downloaded from the product support pages at [www.westermo.com/support/product-support](http://www.westermo.com/support/product-support).

In the event of contamination, the optical connectors in the SFP transceivers should only be cleaned by the use of forced nitrogen and some kind of cleaning stick. Recommended cleaning fluids are methyl-, ethyl-, isopropyl- or isobutyl alcohol, hexane or naphtha.

### 3.7. Supported Transceivers

Firmware prior to 4.4.0 accepts Westermo branded transceivers only. From 4.5.0 other transceivers are accepted with a notice and the product will no longer be UL approved. Temperature specifications are also depending on the used transceivers.



#### **HANDLING OF SFP TRANSCEIVERS**

SFP transceivers are supplied with plugs to avoid contamination inside the optical port. They are very sensitive to dust and dirt. If the fibre optic cable is disconnected from the product, a protective plug must be used on the transmitter/receiver. The protective plug must be kept on during transportation. The fibre optic cable must be handled the same way.

### 3.8. Deviations

With copper transceiver 1100-0148, the specified operating temperature of the product is 0 to 50°C. FRNT reconfiguration times can not be guaranteed with copper transceivers.

### 3.9. Dimensions

Dimensions are stated in mm and are regardless of model.

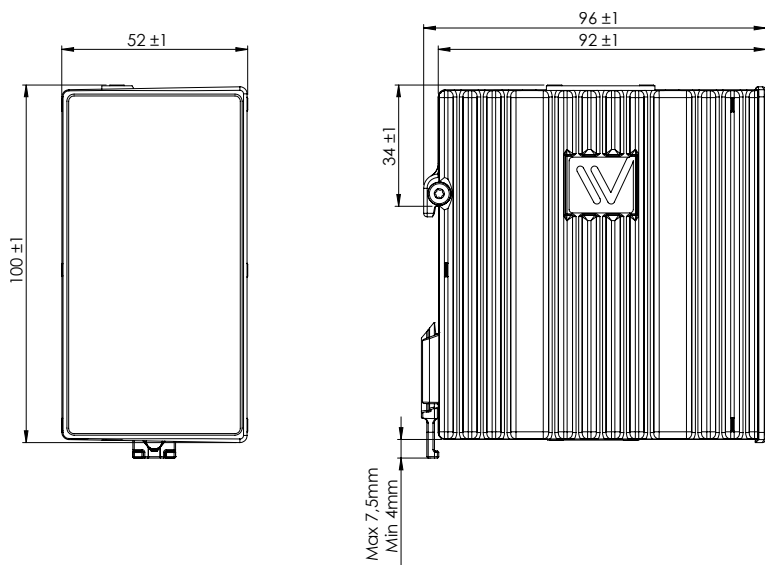


Figure 6. Dimensional drawing

## 4. Installation

### 4.1. Mounting

This product should be mounted on a 35 mm DIN-rail, which is horizontally mounted inside an apparatus cabinet or similar. It is recommended that the DIN-rail is connected to ground. Snap on the product to the DIN-rail according to the figure.

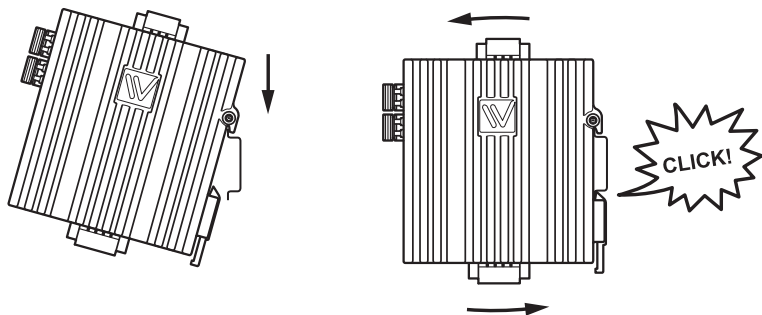


Figure 7. Mounting of product

### 4.2. Removal of Product

This product has an integrated DIN-clip. To remove the product, press down the support at the back with a screwdriver and lift it off the DIN-rail.

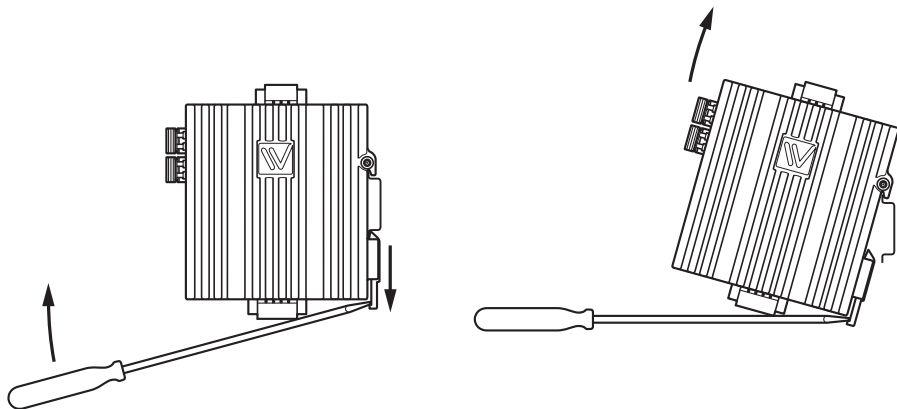


Figure 8. Removal of product

### 4.3. Cooling

This product uses convection cooling. Spacing is recommended for the use of the product in full operating temperature range and service life. To avoid obstructing the airflow around the product, use the following spacing rules.

Minimum spacing of 25 mm (1 inch) above/below and 10 mm (0.4 inches) left/right of the product is recommended.

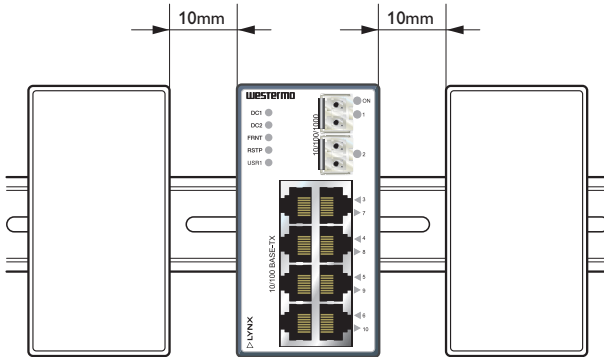


Figure 9. Minimum spacing of product



#### REDUCE THE RISK OF FIRE

To reduce the risk of fire, use only telecommunication line cords with a cable diameter of AWG 26 or larger. Regarding power cable dimensions, see chapter Interface Specifications.

### 4.4. Getting Started

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

- **WeConfig tool**

This is a custom Westermo tool used for discovery of attached Westermo product.

- **Web**

Configuration of the product using the web browser.

- **CLI**

Configuration of the product via the Command Line Interface.

Username: *admin*

Password: *westermo*

If the computer is located in the same subnet as the switch you can easily use a web browser to configure the product. Within the web you can configure most of the available functions. If you are not sure about the subnet – consult your network administrator.

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:

IP address: 192.168.2.200

Netmask: 255.255.255.0

Gateway: disabled

## 4.5. Configuration Via a Web Browser

The product 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 are:

Username: *admin*

Password: *westermo*

Once logged in, 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.



### NOTE

Version of WeConfig tool must be 10.3.0 or higher.

## 4.6. Factory Default

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

1. Power off the product and disconnect all Ethernet cables (copper and fibre).
2. Connect one Ethernet cable between Ethernet ports 3 and 10, and the other between Ethernet ports 6 and 7. 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 cable – when connecting the ports.
3. Power on the product.
4. Wait for the product to start up. Control that the ON LED is flashing red. The product is now ready to be either reset to factory default or to boot as normal.

To go ahead with factory reset:

**NOTE**

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

- 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 product will restart with factory default settings. When the product has booted up, the ON LED will show a green light, and is now ready to use.

To boot as normal:

- 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 product will conduct a normal boot with the existing settings.

## 5. Specifications

### 5.1. Interface Specifications

| DC, Power port                    |                                      |                                                                  |
|-----------------------------------|--------------------------------------|------------------------------------------------------------------|
|                                   | Lx10-F2G:                            | Lx10-F2G-12VDC:                                                  |
| Rated voltage                     | 24 - 48 VDC                          | 12 - 48 VDC                                                      |
| Operating voltage                 | 19 - 60 VDC                          | 9.8 - 60 VDC                                                     |
| Rated current                     | 240 mA at 24 VDC<br>120 mA at 48 VDC | 420 mA at 12 VDC<br>220 mA at 24 VDC<br>115 mA at 48 VDC         |
| Rated frequency                   | DC                                   |                                                                  |
| Inrush current                    | 22.7 mA <sup>2</sup> s at 48 VDC     | 53 mA <sup>2</sup> s at 12 VDC<br>20 mA <sup>2</sup> s at 48 VDC |
| Startup current                   | 2 x rated current                    |                                                                  |
| Polarity                          | Reverse polarity protected           |                                                                  |
| Redundant power input             | Yes                                  |                                                                  |
| Isolation                         | All other ports                      |                                                                  |
| Connector                         | Detachable screw terminal            |                                                                  |
| Conductor cross section           | 0.2-2.5 mm <sup>2</sup> (AWG 24-12)  |                                                                  |
| Stripping length cable            | 7 mm                                 |                                                                  |
| Tightening torque, terminal screw | 0.5 - 0.6 Nm                         |                                                                  |
| Terminal torque, screw flange     | 0.3 Nm                               |                                                                  |
| Shielded cable                    | Not required                         |                                                                  |

| Ethernet TX              |                                         |
|--------------------------|-----------------------------------------|
| Electrical specification | IEEE std 802.3                          |
| Data rate                | 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                | All other ports                         |
| Connector                | RJ-45, auto MDI/MDI-X                   |
| Cabling                  | Shielded CAT5e or better is recommended |
| Conductive chassis       | Yes                                     |
| Number of ports          | 8                                       |

| Ethernet SFP pluggable connections (FX or TX) |                                                          |
|-----------------------------------------------|----------------------------------------------------------|
| Electrical specification                      | IEEE std 802.3                                           |
| Data rate                                     | 100 Mbit/s, 1000 Mbit/s, transceivers supported          |
| Duplex                                        | Full or Auto, depending on transceiver                   |
| Transmission range                            | Depending on transceiver                                 |
| Connection                                    | SFP slot holding fibre transceiver or copper transceiver |
| Number of ports                               | 1 or 2                                                   |

| I/O connection, Relay output      |                                        |
|-----------------------------------|----------------------------------------|
| Maximum voltage/current           | 60 VDC/80 mA                           |
| Connect resistance                | Maximum 30 $\Omega$                    |
| Isolation                         | To all other ports                     |
| Connector                         | Detachable screw terminal              |
| Conductor cross section           | 0.14 - 1.5 mm <sup>2</sup> (AWG 28-16) |
| Stripping length cable            | 7 mm                                   |
| Tightening torque, terminal screw | 0.22 - 0.25 Nm                         |
| Terminal torque, screw flange     | 0.3 Nm                                 |

| I/O connection, Digital input     |                                          |
|-----------------------------------|------------------------------------------|
| Maximum voltage/load current      | 60 VDC/2mA                               |
| Isolation                         | To all other ports                       |
| Connector                         | Detachable screw terminal                |
| Conductor cross section           | 0.14 - 1.5 mm <sup>2</sup> (AWG 28-16)   |
| Stripping length cable            | 7 mm                                     |
| Tightening torque, terminal screw | 0.22 - 0.25 Nm                           |
| Terminal torque, screw flange     | 0.3 Nm                                   |
| Voltage levels                    | Logic one: >12 VDC<br>Logic zero: <1 VDC |

| Console port             |                                                     |
|--------------------------|-----------------------------------------------------|
| Electrical specification | TTL-level                                           |
| Data rate                | 115.2 kbit/s                                        |
| Circuit type             | SELV                                                |
| Data format              | 8 data bits, no parity, 1 stop bit, no flow control |
| Connection               | 2.5 mm jack, use only Westermo cable 1211-2027      |

## 5.2. Type Tests and Environmental Conditions

| Environmental phenomena        | Basic standard                          | Description    | Test levels                                                                                                                                                                                                                                      |
|--------------------------------|-----------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESD                            | EN 61000-4-2                            | Enclosure      | Contact: $\pm 6$ kV<br>Air: $\pm 8$ kV                                                                                                                                                                                                           |
| Fast transients                | EN 61000-4-4                            | Power port     | $\pm 2$ kV, direct coupling                                                                                                                                                                                                                      |
|                                |                                         | Earth port     |                                                                                                                                                                                                                                                  |
|                                |                                         | Ethernet ports | $\pm 2$ kV, capacitive coupling clamp                                                                                                                                                                                                            |
|                                |                                         | I/O port       |                                                                                                                                                                                                                                                  |
| Surge                          | EN 61000-4-5                            | Power port     | L-E: $\pm 2$ kV, 12 $\Omega$ , 9 $\mu$ F, 1.2/50 $\mu$ s<br>L-E: $\pm 2$ kV, 42 $\Omega$ , 0.5 $\mu$ F, 1.2/50 $\mu$ s<br>L-L: $\pm 1$ kV, 2 $\Omega$ , 18 $\mu$ F, 1.2/50 $\mu$ s<br>L-L: $\pm 1$ kV, 42 $\Omega$ , 0.5 $\mu$ F, 1.2/50 $\mu$ s |
|                                |                                         | Ethernet ports | L-E: $\pm 2$ kV, 2 $\Omega$ , direct on shield, 1.2/50 $\mu$ s                                                                                                                                                                                   |
|                                |                                         | I/O port       | L-E, L-L: $\pm 1$ kV, 12 $\Omega$ , 9 $\mu$ F, 1.2/50 $\mu$ s<br>L-E, L-L: $\pm 2$ kV, 42 $\Omega$ , 0.5 $\mu$ F, 1.2/50 $\mu$ s                                                                                                                 |
| 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 RF immunity           | EN 61000-4-3                            | Enclosure      | 20 V/m at (80 - 2700) MHz<br>10 V/m at (2.7 - 6) GHz<br>1 kHz sine, 80% AM                                                                                                                                                                       |
| Conducted RF immunity          | EN 61000-4-6                            | Power port     | 10 V, 80% AM, 1 kHz; (0.15-80) MHz                                                                                                                                                                                                               |
|                                |                                         | Signal ports   |                                                                                                                                                                                                                                                  |
|                                |                                         | Earth port     |                                                                                                                                                                                                                                                  |
| Radiated RF emission           | CISPR 16-2-3<br>IEC 60945<br>ANSI C63,4 | Enclosure      | Class A (Industrial), 30 MHz to 6 GHz<br>DNVGL-CG - Bridge and Deck Zone, 0.15 MHz to 2 GHz<br>FCC Part 15 B, Class A, 6.5 GHz                                                                                                                   |
| Conducted RF emission          | CISPR 16-2-1<br>IEC 60945<br>ANSI C63,4 | Power port     | Class B (Residential), 0.15 to 30 MHz<br>DNVGL-CG - Bridge and Deck Zone, 10 kHz to 30 MHz                                                                                                                                                       |
|                                |                                         | Signal ports   |                                                                                                                                                                                                                                                  |
| Compass safe distance          | IEC 60945                               | Enclosure      | Standard compass (5.4°/H deviation) = 15 cm<br>Steering/standby steering /emergency compass (18°/H deviation) = 10 cm                                                                                                                            |
| Supply voltage surge           | AREMA                                   | Power port     | 3 x $U_N$ , 80 ms (72 VDC) <sup>a</sup> .                                                                                                                                                                                                        |
| Power supply failure           | DNVGL-CG-0339                           | Power port     | $U_N$ -100 %, 30 s                                                                                                                                                                                                                               |

| Environmental phenomena                          | Basic standard           | Description                       | Test levels                                                     |
|--------------------------------------------------|--------------------------|-----------------------------------|-----------------------------------------------------------------|
| Power supply variation                           | DNVGL-CG-0339            | Power port                        | $1.3 \times U_N$ (62.4 VDC), $0.75 \times U_N$ (18 VDC), 15 min |
| Immunity to conducted low frequency interference | DNVGL-CG-0339            | Power port                        | 3 Vrms, 0.05 to 10 kHz                                          |
| Dielectric strength                              | UL 62368-1               | Power port to all other ports     | 1.5 kVrms, 50 Hz, 1 min                                         |
|                                                  |                          | I/O port to all other ports       |                                                                 |
|                                                  | UL 62368-1<br>IEEE 802.3 | Ethernet ports to all other ports |                                                                 |
| Insulation resistance                            | DNVGL-CG-0339            | Power port to all other ports     | 500 VDC, 60 s, $> 3 \text{ G}\Omega$                            |

<sup>a</sup>Only valid for L110-F2G-12VDC

*Table 12. EMC and electrical conditions*

| Environmental phenomena | Basic standard               | Description           | Test levels                                                                                                                  |
|-------------------------|------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------|
| Temperatures            | EN 60068-2-1<br>EN 60068-2-2 | Operational           | Lx10-F2G-12VDC: -40 to +74°C (-40 to +165°F) <sup>a</sup><br><br>Lx10-F2G: -40 to +70°C (-40 to +158°F)                      |
|                         |                              | Storage and transport | -50 to +85°C (-58 to +185°F)                                                                                                 |
| Humidity                | EN 60068-2-30                | Operational           | 5-95 % relative humidity                                                                                                     |
|                         |                              | Storage and transport |                                                                                                                              |
| Altitude                |                              | Operational           | 2000 m/80 kPa                                                                                                                |
| Service life            |                              | Operational           | 10 years                                                                                                                     |
| MTBF                    | MIL-HDBK 217F                |                       | 630,000 hours                                                                                                                |
| Vibration               | IEC 60068-2-6 (sine)         | Operational           | 3 - 13.2 Hz: 1 mm<br>13.2 - 100 Hz 0.7 g<br><br>5.5 - 30 Hz: 1.5 g<br>30 - 50 Hz: 0.42 mm<br>50 - 500 Hz: 4.2 g <sup>b</sup> |
| Shock                   | IEC 60068-2-27               | Operational           | 30 g, 11 ms<br>100 g, 6 ms <sup>b</sup>                                                                                      |
| Bump                    | IEC 60068-2-27               | Operational           | 10 g, 11 ms                                                                                                                  |
| Enclosure               | UL 62368-1                   | Zinc                  | Fire enclosure                                                                                                               |
| Weight                  |                              |                       | 0.7 kg                                                                                                                       |
| Degree of protection    | EN 60529                     | Enclosure             | IP40                                                                                                                         |
| Cooling                 |                              |                       | Convection                                                                                                                   |

<sup>a</sup>Refer to "Safety and Regulations" chapter regarding touch temperature

<sup>b</sup>Might require Ethernet cables to be fastened close to the unit.

**Table 13. Environmental and mechanical conditions**

## 6. Revision Notes

| Revision | Date    | Change description                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rev. S   | 2023-05 | 3.4.4 Connection to the Console Port; accessories updated, 3.5 LED Indicators; text updated                                                                                                                                                                                                                                                                                                                                                                                                   |
| Rev. R   | 2022-06 | 1.3 Software Tools; link updated, 3.5 LED Indicators; text updated, 4.6 Factory Default; text updated, 5.2 Type Tests and Environmental Conditions; text updated (Altitude)                                                                                                                                                                                                                                                                                                                   |
| Rev. Q   | 2022-02 | 2.5.3 UL 62368-1 DC Mains Notice added                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Rev. P   | 2021-04 | 2.5.1 Agency Approvals and Standards Compliance updated, 2.5.2 UL 62368-1 Notice new chapter, 2.5.6 Simplified Declaration of Conformity text and logo updated, 5.2 Type Tests and Environmental Conditions updated                                                                                                                                                                                                                                                                           |
| Rev. O   | -       | Westermo logo updated, illustrations updated from brown to blue, new information structure throughout the manual, 1.2 About This Guide - new chapter, 2 Safety and Regulations - entire chapter updated, 2.5.3 AREMA - new chapter, 3.1. Product Description updated, 3.2. Available Models - new chapter, 3.5 LED Indicators updated, 3.6 SFP Transceivers updated, 3.9 Dimensions - new chapter, 4.1 Mounting updated, 4.2 Removal of Product updated, 5.1 Interface Specifications updated |

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