



# Lynx L108/208-F2G-S2

Industrial Ethernet 8-Port Device Server Switch



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# 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
 WARNING	Indicates a potentially hazardous situation	Possible death or major injury	Major damage to the product
 CAUTION	Indicates a potentially hazardous situation	Minor or moderate injury	Moderate damage to the product
 NOTICE	Provides information in order to avoid misuse of the product, confusion or misunderstanding	No personal injury	Minor damage to the product
 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 61000-6-3, Emission residential 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>AREMA<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 Lx08-F2G-S2-12VDC

<sup>b</sup>Valid for Lx08-F2G-S2

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 B Notice**

This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This product generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this product does cause harmful interference to radio or television reception, which can be determined by turning the product off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the unit and receiver
- Connect the product into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

**2.5.5. AREMA**

Lx08-F2G-S2-12VDC has been tested according to AREMA Part 11.3.3, 11.5.1 and 11.5.2.

Port	Test	Remark
DC Power	$3 \times U_N, 80 \text{ ms}$	$U_N (\text{max})=24 \text{ VDC}$ 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 otherwise 48 VDC
2. Surge protection clamping voltage is 87.1 VDC
3. Maximum energy handling capability is 5 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 +70°C (-40 to +158°F) can be achieved with no moving parts or cooling holes in the case.

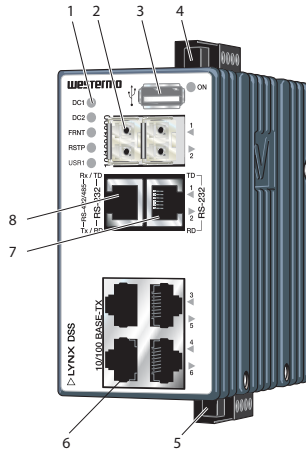
The Lynx series has been tested both by Westermo and external test institutes to meet many EMC, isolation, vibration and shock standards, all to the highest levels suitable for heavy industrial environments and rail trackside applications.

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

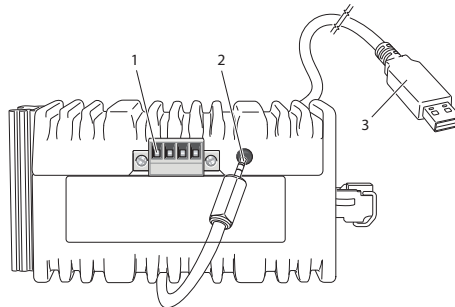
Art. no.	Model	100 Mbit TX ports	Gbit SFP ports	Serial ports	SW	Rated voltage
3643-0200	L108-F2G-S2	4	2	2	L2	24-48 VDC
3643-0240	L108-F2G-S2-12VDC	4	2	2	L2	12-24 VDC
3643-0205	L208-F2G-S2	4	2	2	L3	24-48 VDC
3643-0245	L208-F2G-S2-12VDC	4	2	2	L3	12-24 VDC

### 3.3. Hardware Overview



No.	Description	No.	Description
1	LED indicators	2	SFP transceivers
3	USB connection	4	Power connection
5	I/O connection	6	Ethernet connection
7	RS-232 connection	8	RS-232 and RS-422/485 connection

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			

Table 7. Ethernet connection TX

#### 3.4.2. Power Input

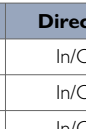
Illustration	Position	Product marking	Direction	Description
	1	+DC1	Input	Supply voltage
	2	+DC2	Input	Supply voltage
	3	-COM	Input	Common
	4	-COM	Input	Common

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.

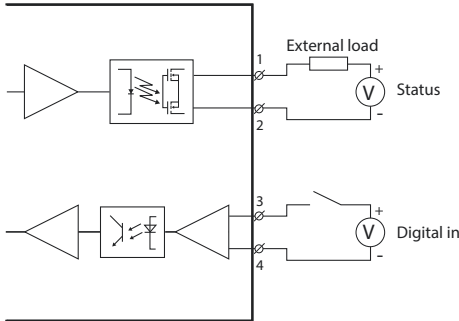


Figure 5. Digital in

### 3.4.4. RS-232 Connection (DCE)

Illustration	Pin no.	Signal	Direction	Description
	1	DSR	Out	Data Set Ready
	2	DCD	Out	Data Carrier Detect
	3	DTR	In	Data Terminal Ready
	4	SG	-	Signal Ground, not chassis ground
	5	RD	Out	Receive Data
	6	TD	In	Transmit Data
	7	CTS	Out	Clear To Send
	8	RTS	In	Request To Send

Table 10. RS-232 connection



### 3.4.5. RS-422/485 Connection

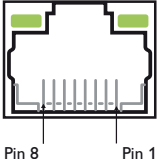
Illustration	Pin no.	Signal		Direction	Description
		RS-422 (4-wire)	RS-485 (2-wire)		
	1	T+	T+/R+	Out/In	RS-422: Transmit RS-485: Transmit/Receive
	2	T-	T-/R-	Out/In	RS-422: Transmit RS-485: Transmit/Receive
	3	R-	-	In	RS-422: Receive
	4	-	-	-	Not used
	5	-	-	-	Not used
	6	R+	-	In	RS-422: Receive
	7	-	-	-	Not used
	8	-	-	-	Not used

Table 11. RS-422/485 connection

Lynx is equipped with with an internal termination that is configurable through software in RS-422/485 mode. The following termination schemes are supported:

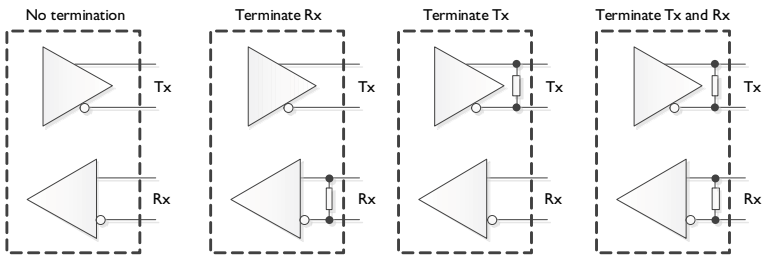


Figure 6. RS-422 termination scheme

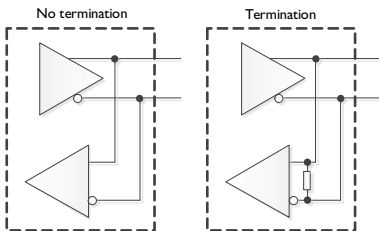


Figure 7. RS-485 termination scheme

When the unit is powered off or during reboot, any internal termination will be disconnected from the signal lines.



**NOTE**

NOTE - The port is configurable for both RS-232 and RS-422/485, hence no fail-safe biasing is available for RS-422/485 signals.

**3.4.6. 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 12. Accessories table

**3.4.7. USB Connection**

Illustration	Pin no.	Direction	Description
	1	Out	VBUS
	2	In/Out	D-
	3	In/Out	D+
	4	Out	GND
	5	In/Out	Connected to protective earth

Table 13. USB connection

### 3.5. LED Indicators

LED	Status	Description	Illustration
ON	OFF	Product has no power	<p>The illustration shows the front panel of the device with various indicators and ports. At the top right is a power button labeled 'ON'. Below it are five LEDs: DC1, DC2, FRNT, RSTP, and USR1. To the left of these LEDs is a USB port. Below the LEDs are two RS-232 ports labeled 'RS-422/RS-485' and 'RS-232'. Below these are two Ethernet ports labeled 'Tx/RD' and 'TD'. At the bottom are six Ethernet ports labeled '10/100 BASE-TX' and 'LYNX DSS'. The ports are numbered 1 through 6.</p>
	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>		
Rx/TD, TD	OFF	No serial data received	
	GREEN FLASH	Serial data received	
Tx/RD, RD	OFF	No serial data transmitted	
	GREEN FLASH	Serial data transmitted	
Ethernet 1 to 6	OFF	No link	
	GREEN	Link established	
	GREEN FLASH	Data traffic indication	

LED	Status	Description	Illustration
	YELLOW	Port alarm, or port is set in blocking state by link redundancy protocol	

Table 14. 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.

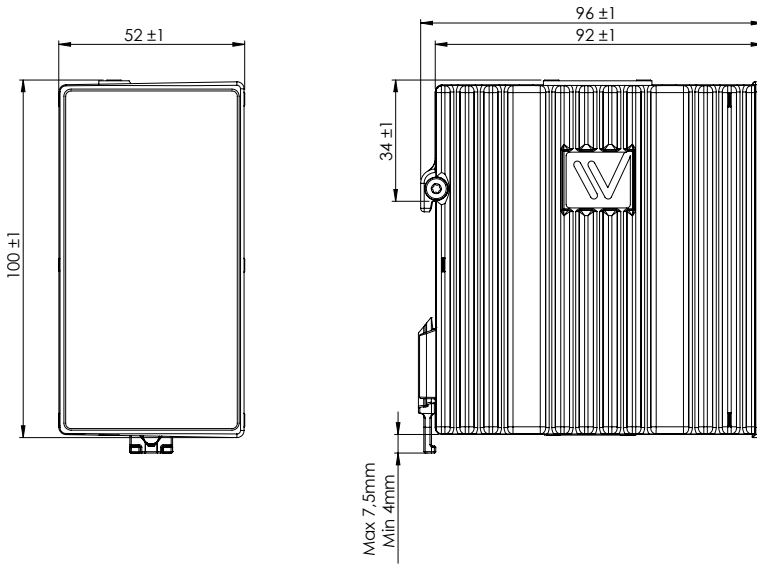


Figure 8. Dimensional drawing

## 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 the product to the DIN-rail according to the figure.

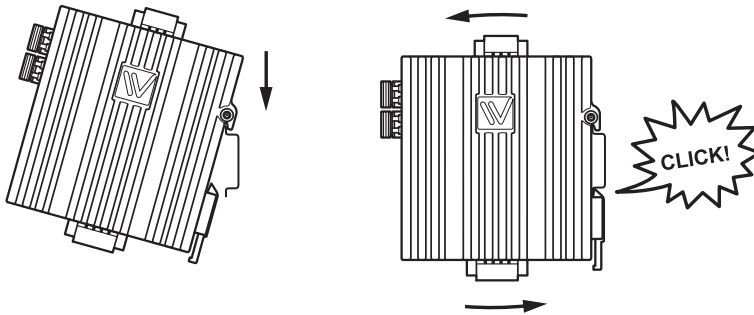


Figure 9. Mounting of product

### 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.

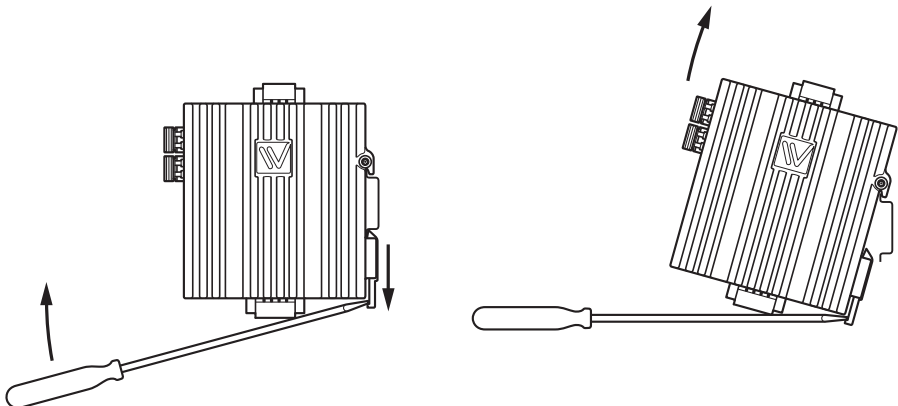


Figure 10. Removal of product

### 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.

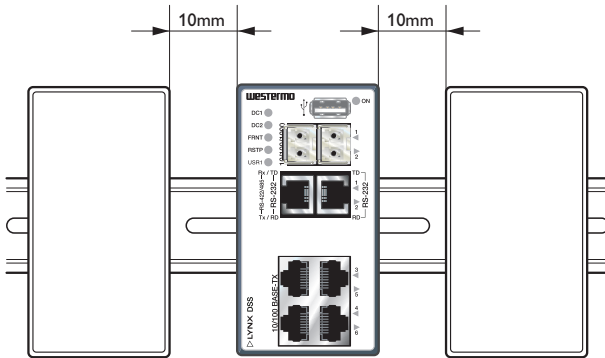


Figure 11. Minimum spacing of product



#### 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 6, and the other between Ethernet ports 4 and 5. 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		
	Lx08-F2G-S2-12VDC:	Lx08-F2G-S2:
Rated voltage	12 - 24 VDC	24 - 48 VDC
Operating voltage	9.8 - 36 VDC	19 - 60 VDC
Rated current	470 mA (820 mA) at 12 VDC (with 500 mA USB load) 230 mA (390 mA) at 24 VDC (with 500 mA USB load)	250 mA (380 mA) at 24 VDC (with 500 mA USB load) 120 mA (188 mA) at 48 VDC (with 500 mA USB load)
Rated frequency	DC	
Inrush current	102 mA <sup>2</sup> s at 12 VDC 71,2 mA <sup>2</sup> s at 24 VDC	22,7 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	
Tightening torque, screw flange	0.3 Nm	
Shielded cable	Not required	

<b>Ethernet TX</b>	
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
Connection	RJ-45, auto MDI/MDI-X
Cabling	Shielded CAT5e or better is recommended
Conductive chassis	Yes
Number of ports	4

<b>Ethernet SFP pluggable connections (FX or TX)</b>	
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; see datasheet for SFP transceivers
Connection	SFP slot holding fibre transceiver or copper transceiver
Number of ports	1 or 2

<b>RS-232</b>	
Electrical specification	EIA RS-232
Data rate	300 bit/s - 115.2 kbit/s
Data format	7 or 8 data bits, odd, even or none parity, 1 or 2 stop bits
Protocol	Transparent, optimised by packing algorithm
Circuit type	SELV
Transmission range	15 m/49 ft
Isolation	To all other ports
Connection	RJ-45 according to EIA-561
Shielded cable	Recommended
Conductive chassis	Yes
Number of ports	1

<b>RS-422/485</b>	
Electrical specification	Configurable for EIA RS-232 or EIA RS-422/485
Data rate	50 bit/s - 2 Mbit/s
Data format	7 or 8 data bits, odd, even or none parity, 1 or 2 stop bits (2 stop bits only when no parity is set)
Circuit type	TNV-1
Transmission range	Up to 1200 m/0.74 mi, depending on data rate and cable type
Isolation	To all other ports
Connection	RJ-45 according to EIA-561
Shielded cable	Shielded cable not required, except when installed in Railway application as signalling and telecommunications apparatus and located close to rails <sup>a</sup>
Conductive chassis	Yes
Number of ports	1

<sup>a</sup>To minimise the risk of interference, a shielded cable is recommended when the cable is located inside 3 m boundary or the cable is longer than 30 m and inside 10 m boundary to the rails and connected to this port.

<b>I/O connection, Relay output</b>	
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
Tightening torque, screw flange	0.3 Nm

**I/O connection, Digital input**

Maximum voltage/current	60 VDC/2mA
Voltage levels	Logic one: >12 V Logic zero: <1 V
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
Tightening torque, screw flange	0.3 Nm

**USB**

Electrical specification	USB 2.0 host interface
Data rate	Up to 12 Mbit/s (full speed mode)
Circuit type	SELV
Maximum supply current	400 mA
Connection	USB receptable connector type A

**Console port**

Electrical specification	LVTTTL-level (service port, shall not be connected during normal operation. Only to be used during maintenance.)
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 Air: $\pm 8$ kV
Fast transients	EN 61000-4-4	Power port	$\pm 2$ kV, direct coupling
		Earth	
		Ethernet ports	$\pm 2$ kV, capacitive coupling clamp
		Serial ports	
		I/O port	
Surge	EN 61000-4-5	Power port	L-E: $\pm 2$ kV, $12 \Omega$ , $9 \mu\text{F}$ , $1.2/50 \mu\text{s}$ L-E: $\pm 2$ kV, $42 \Omega$ , $0.5 \mu\text{F}$ , $1.2/50 \mu\text{s}$ L-L: $\pm 1$ kV, $2 \Omega$ , $18 \mu\text{F}$ , $1.2/50 \mu\text{s}$ L-L: $\pm 1$ kV, $42 \Omega$ , $0.5 \mu\text{F}$ , $1.2/50 \mu\text{s}$
		Ethernet ports	L-E: $\pm 2$ kV, $2 \Omega$ , direct on shield, $1.2/50 \mu\text{s}$
		I/O port	L-E, L-L: $\pm 1$ kV, $12 \Omega$ , $9 \mu\text{F}$ , $1.2/50 \mu\text{s}$ L-E, L-L: $\pm 2$ kV, $42 \Omega$ , $0.5 \mu\text{F}$ , $1.2/50 \mu\text{s}$
		RS-232	L-E: $\pm 2$ kV, $2 \Omega$ , $0.5 \mu\text{F}$
		RS-422/485	L-E: $\pm 2$ kV, $42 \Omega$ , $0.5 \mu\text{F}$
Power frequency magnetic field	EN 61000-4-8	Enclosure	300 A/m; 0, 16.7, 50, 60 Hz 1000 A/m; 50 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 10 V/m at (2.7 - 6) GHz 1 kHz sine, 80% AM
Conducted RF immunity	EN 61000-4-6	Power port	10 V, 80% AM, 1 kHz; (0.15-80) MHz
		Ethernet	
		I/O port	
		Serial ports	
		Earth	
Radiated RF emission	CISPR 16-2-3 IEC 60945 ANSI C63,4	Enclosure	Class B (Residential), 30 MHz to 6 GHz DNVGL-CG - Bridge and Deck Zone, 0.15 MHz to 2 GHz FCC Part 15 B, Class B, 6.5 GHz
Conducted RF emission	CISPR 16-2-1 IEC 60945 ANSI C63,4	Power port	Class B/DNV bridge
		Ethernet	Class B

Environmental phenomena	Basic standard	Description	Test levels
Compass safe distance	IEC 60945	Enclosure	Standard compass (5.4°/H deviation) = 15 cm Steering/standby steering / emergency compass (18°/H deviation) = 10 cm
Supply voltage surge	AREMA	Power port	$3 \times U_N$ , 80 ms (72 VDC) <sup>a</sup>
Power supply failure	DNVGL-CG-0339	Power port	$U_N$ -100 %, 30 s
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	
		RS-232 port to all other ports	
		RS-422/485 port to all other ports	
	UL 62368-1 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 GΩ

<sup>a</sup>Only valid for 108-F2G-S2-12VDC

Table 15. EMC and electrical conditions

Environmental phenomena	Basic standard	Description	Test levels
Temperatures	EN 60068-2-1 EN 60068-2-2	Operational	-40 to +70°C (-40 to +158°F) <sup>a</sup>
		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-C217F2, Parts count		517,000 hours
Vibration	IEC 60068-2-6 (sine)	Operational	3 - 13.2 Hz: 1 mm 13.2 - 100 Hz: 0.7 g  5.5 - 30 Hz: 1.5 g 30 - 50 Hz: 0.42 mm 50 - 500 Hz: 4.2 g <sup>b</sup>
	IEC 60068-2-64 (random)	Operational	5 - 20 Hz: 2 m <sup>2</sup> /s <sup>2</sup> 20 - 2000 Hz - 3 dB/oct
Shock	IEC 60068-2-27	Operational	30 g, 11 ms 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 16. Environmental and mechanical conditions*



## 6. Revision Notes

Revision	Date	Change description
Rev. T	2023-05	3.4.6 Connection to the Console Port; accessories updated, 3.5 LED Indicators; text updated
Rev. S	2022-06	2.2 Safety Information; 4.6 Factory Default; text updated
Rev. R	2022-05	New model L208-F2G-S2-12VDC added to the user guide.
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, 2.5.5 Simplified Declaration of Conformity text and logo updated, 5.2 Type Tests and Environmental Conditions updated
Rev. O	2020-11	3.4.6 Console Port - new missing chapter
Rev. N	2020-10	Westermo logo updated, illustrations updated from brown to blue, 2.2 Safety Information updated (text and warnings), 2.3 Care Recommendations updated, old 2.4 Maintenance deleted, 2.5.1 Agency Approvals and Standards Compliance updated, 3.1 Product Description updated, 3.6 SFP Transceivers updated, 3.7 Supported Transceivers updated, 4.2 Removal of Product updated
Rev. M	2019-09	2.6.1 Agency Approvals and Standards Compliance updated, 2.6.3 New chapter, 3.1 Product Description updated, 5.1 Interface specifications updated (USB), 5.2 Type Tests and Environmental Conditions updated (temperature)
Rev. L	2019-04	Added product L108-F2G-S2-12VDC and references to it - frontpage, 2.6.1 Agency approvals and Standards Compliance, 3.1 Product Description, 5.1 Interface Specifications, 5.2 Type Tests and Environmental Conditions

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