

USER MANUAL

LBH120A-H SERIES AND LMC270A-XX-XX SERIES

INDUSTRIAL SWITCH/ CONVERTER

24/7 TECHNICAL SUPPORT AT 1.877.877.2269 OR VISIT BLACKBOX.COM

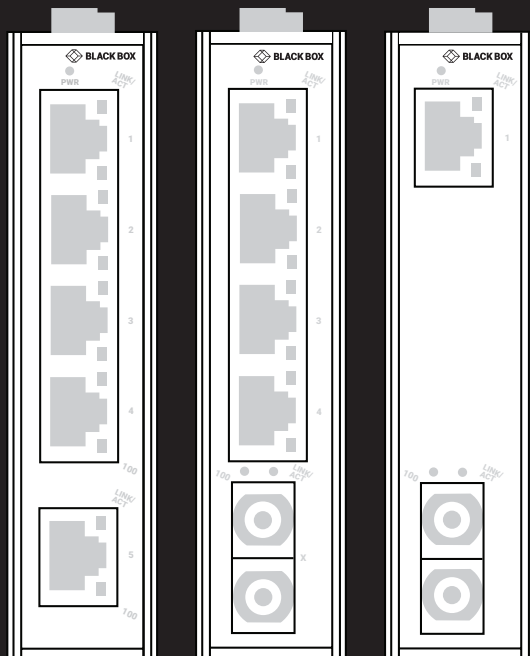


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CHAPTER 1: SPECIFICATIONS

SPECIFICATIONS

Approvals	
ISO	Manufactured in an ISO 9001 facility
Safety	UL 62368
EMI	FCC Part 15B, Class A , VCCI Class A , EN 61000-6-4, EN 61000-3-2, EN 61000-3-3
EMS	EN 61000-6-2 , EN 61000-4-2 (ESD Standards) , EN 61000-4-3 (Radiated RFI Standards) , EN 61000-4-4 (Burst Standards) , EN 61000-4-5 (Surge Standards), Signal ports: ±4kV line-to-ground, EN 61000-4-6 (Induced RFI Standards), EN 61000-4-8 (Magnetic Field Standards)
Environmental Test Compliance	IEC 60068-2-6 Fc (Vibration), IEC 60068-2-27 Ea (Shock), FED STD 101C Method 5007.1 (Free fall w/ package)
Technology	
Standards	IEEE 802.3u 100BASE-TX/FX, IEEE 802.3x full-duplex flow control, IEEE 802.3az Energy Efficient Ethernet, IEEE 802.1p Quality of Service (QoS)
Forwarding and Filtering Rate	10 Mbps: 14,880 pps, 100 Mbps: 148,810 pps
Packet Buffer Memory	448 KB
Processing Type	Store-and-Forward, Half-duplex back-pressure and IEEE802.3x full-duplex flow control, Auto Negotiation, Auto MDI/MDIX
Address Table Size	1K MAC addresses
Power	
Power Input	12–48 VDC
Power Consumption	1.82 W Max. 0.14A @ 12 VDC, 0.07A @ 24 VDC, 0.038A @ 48 VDC

CHAPTER 1: SPECIFICATIONS

SPECIFICATIONS (CONTINUED)

Mechanical	
Connectors	LBH120A-H: (4) RJ-45 device ports, (1) RJ-45 uplink port; LBH120A-H-SC, LBH120A-H-20K-SC, LBH120A-H-40K-SC, LBH120A-H-75K-SC: (4) RJ-45 device ports, (1) pair of SC fiber ports for uplink; LBH120A-H-ST: (4) RJ-45 device ports, (1) pair of ST fiber ports for uplink; LMC270A-MM-SC, LMC270A-SM-20K-SC, LMC270A-SM-40K-SC, LMC270A-SM-75K-SC: (1) RJ-45 port, (1) pair of SC fiber ports; LMC270A-MM-ST, LMC270A-SM-ST: (1) RJ-45 port, (1) pair of ST fiber ports
Indicators	Per RJ-45 port: (1) Link/Activity LED, (1) Speed LED; Per SC or ST fiber port: (1) Link/Activity LED, (1) Speed LED
Enclosure	Plastic IP30
Mounting	DIN rail, top hat type 35-mm
Dimensions	Each unit: 4.33"H x 1.02"W x 2.76"D (11 x 2.6 x 7 cm)
Weight	0.44 lb. (0.2 kg)
Environment	
Operating Temperature	14 to 140° F (10 to 60° C); Tested at -4 to +158° F (-20 to +70° C)
Storage Temperature	-40 to +185° F (-40 to +85° C)
Ambient Relative Humidity	5 to 95%, noncondensing



CHAPTER 2: OVERVIEW

2.1 OVERVIEW

The Industrial Switches and Industrial Media Converters operate at temperature extremes of 14 to 140° F (-10 to +60° C). These units are ideal for harsh environments constrained by space.

The switches provide four twisted-pair device ports and one twisted-pair or fiber uplink port. The media converters link twisted-pair segments or devices to fiber segments or devices.

2.2 AVAILABLE MODELS

The models listed below are available.

2.2.1 INDUSTRIAL SWITCHES

- LBH120A-H (four RJ-45 twisted-pair device connectors, and one RJ-45 twisted-pair uplink connector)
- LBH120A-H-SC (four RJ-45 twisted-pair device connectors, and one pair of SC fiber uplink connectors)
- LBH120AH-ST (four RJ-45 twisted-pair device connectors, and one pair of ST fiber uplink connectors)
- LBH120A-H-20K-SC (four RJ-45 twisted-pair device connectors, and one pair of SC fiber uplink connectors, 20 km distance)
- LBH120A-H-40K-SC (four RJ-45 twisted-pair device connectors, and one pair of SC fiber uplink connectors, 40 km distance)
- LBH120A-H-75K-SC (four RJ-45 twisted-pair device connectors, and one pair of SC fiber uplink connectors, 75 km distance)

2.2.2 INDUSTRIAL MEDIA CONVERTERS

- LMC270A-MM-SC (one RJ-45 twisted-pair connector and one pair of SC multimode fiber connectors)
- LMC270A-MM-ST (one RJ-45 twisted-pair connector and one pair of ST multimode fiber connectors)
- LMC270A-SM-20K-SC (one RJ-45 twisted-pair connector and one pair of SC single-mode fiber connectors, 20 km distance)
- LMC270A-SM-40K-SC (one RJ-45 twisted-pair connector and one pair of SC single-mode fiber connectors, 40 km distance)
- LMC270A-SM-75K-SC (one RJ-45 twisted-pair connector and one pair of SC single-mode fiber connectors, 75 km distance)
- LMC270A-SM-20K-ST (one RJ-45 twisted-pair connector and one pair of ST single-mode fiber connectors, 20 km distance)

2.3 FEATURES

- Complies with EN61000-6-2 & EN61000-6-4 EMC Generic standard immunity for industrial environment.
- Supports IEEE 802.3az 10BASE-TE only. 10BASE-T is not supported. 10BASE-TE is fully interoperable with 10BASE-T over 328 feet (100 meters) of class D (Category 5) or better cabling as specified in ISO/IEC 11801:1995.
- Supports 802.3az/802.3u/802.3x. Auto-negotiation: 10/100Mbps, Full/Half-duplex. Auto MDI/MDIX.
- 100BASE-FX: Multi mode SC or ST type, Single mode SC or ST type.
- 100BASE-BX: WDM Multi mode or Single mode SC type.
- Supports 1024 MAC addresses, 448K bits buffer memory.
- IEEE802.3x Flow control for Full-duplex, Back pressure for Half-duplex.
- Non-blocking architecture and full wire-speed forwarding rate.

CHAPTER 2: OVERVIEW

- ◆ Supports IEEE802.1p QoS with two priority queues.
- ◆ Supports IEEE802.3az Energy Efficient Ethernet (EEE).
- ◆ Supports Max. length of frame up to 1552 Bytes.
- ◆ Power Consumption: 1.82 W Max. 0.14 A @ 12 VDC, 0.07 A @ 24 VDC, 0.038 A @ 48 VDC.
- ◆ Power Supply: DC Terminal Block power input, 12-48 VDC.
- ◆ Operating temperature ranges from 14 to 140° F (-10 to +60° C).

2.4 WHAT'S INCLUDED

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 877-877-2269 or INFO@BLACKBOX.COM.

- ◆ (1) Industrial Ethernet Switch or (1) Industrial Ethernet Media Converter
- ◆ (1) Quick Start Guide

2.5 HARDWARE DESCRIPTION

Figure 2-1 shows three available models. Table 2-1 describes their components. Models not pictured have the same components as shown in the diagram, but have different fiber optic port speeds. For a complete list of available models and their port descriptions, see Table 2-2.

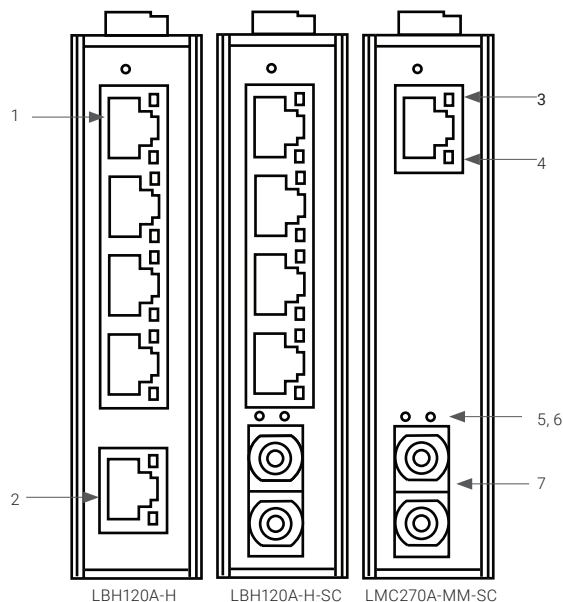


FIGURE 2-1. LBH120A-H, LBH120A-H-SC AND LMC270A-MM-SC MODELS

CHAPTER 2: OVERVIEW**TABLE 2-1. LBH120A-H, LBH120A-H-SC AND LMC270A-MM-SC COMPONENTS**

NUMBER IN FIGURE 2-1	COMPONENT	DESCRIPTION
1	(4) RJ-45 connectors	Links to RJ-45 devices
2	(1) RJ-45 connector	Links twisted-pair uplink
3	(1) Link/Activity LED	Lights when there is activity on the link
4	(1) Speed LED on RJ-45 connector	Lights when data is being transmitted at 100 Mbps
5	(1) Link/Activity LED on RJ-45 connector	Lights when there is activity on the link
6	(1) Speed LED on SFP port	Lights when data is being transmitted at 100 Mbps
7	(1) pair of SC or ST connectors	Links to fiber optic cable, uplink port on the LBH120A-H-SC and device port on the LMC270A-MM-SC

TABLE 2-2. PORTS ON THE SWITCHES AND MEDIA CONVERTERS

PRODUCT CODE	NUMBER OF RJ-45 PORTS	NUMBER OF FIBER PORTS
SWITCHES		
LBH120A-H	5 (4 device, 1 uplink)	None
LBH120A-H-SC	4	(1) SC
LBH120A-H-ST	4	(1) ST
LBH120A-H-20K-SC	4	(1) SC, 20 km distance
LBH120A-H-40K-SC	4	(1) SC, 40 km distance
LBH120A-H-75K-SC	4	(1) SC, 75 km distance
MEDIA CONVERTERS		
LMC270A-MM-SC	1	(1) SC
LMC270A-MM-ST	1	(1) ST
LMC270A-SM-20K-SC	1	(1) SC, 20 km distance
LMC270A-SM-40K-SC	1	(1) SC, 40 km distance
LMC270A-SM-75K-SC	1	(1) SC, 75 km distance
LMC270A-SM-20K-ST	1	(1) ST, 20 km distance

CHAPTER 3: INSTALLATION

3.1 PREPARING THE INSTALLATION SITE

Before you install the device, be sure your operating environment meets the operating environment requirements listed below.

Power source:

- ◆ Provide a power source within 6 feet (1.8 meters) of the installation location. Power specifications for the Hardened Unmanaged Switch are shown in Chapter 1, Specifications.

Environment:

- ◆ Install the Hardened Unmanaged Switch in a dry area, with ambient temperature between -14 and +140° F (-10 and +60° C).
- ◆ The installation location should have a maximum relative humidity of 95%, non-condensing.
- ◆ Do not restrict airflow by covering or obstructing the top and side panels of the Hardened Unmanaged Switch. Keep at least 2 inches (5.08 centimeters) free on all sides for cooling.

3.2 INSTALLATION STEPS

STEP 1: Install the unit on the DIN rail. Place the switch on the DIN rail from above using the slot. Push the front of the switch toward the mounting surface until it audibly snaps into place.

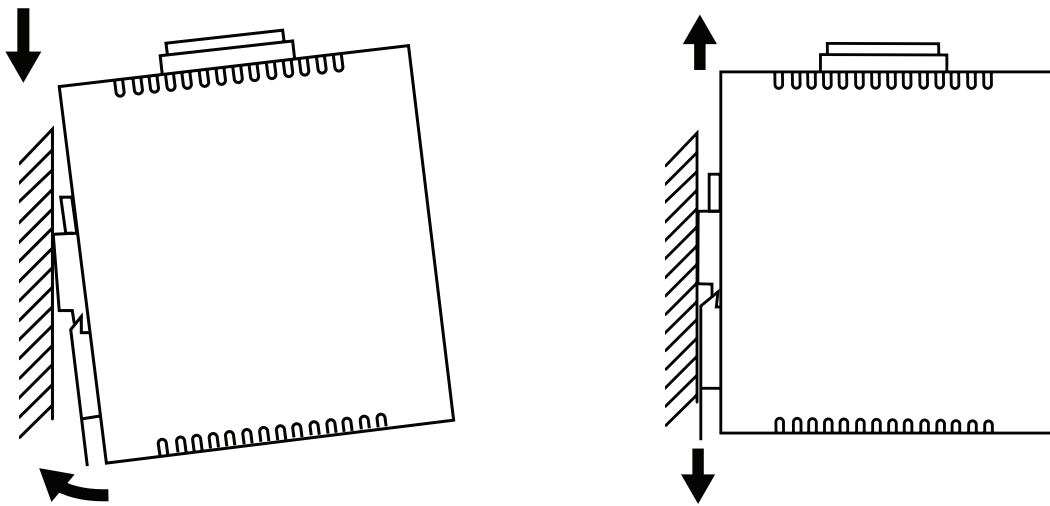


FIGURE 3-1. INSTALLING THE UNIT ON A DIN RAIL

CHAPTER 3: INSTALLATION

STEP 2: Connect 10/100BASE-TX.

The table below lists the pinouts of the 10/100BASE-TX ports. The picture shows the connector pinout.

TABLE 3-1. 10/100BASE-TX PINOUTS

PIN	REGULAR PORTS	UPLINK PORT
1	Input Receive Data +	Output Transmit Data +
2	Input Receive Data -	Output Transmit Data -
3	Output Transmit Data +	Input Receive Data +
4	Not connected	Not connected
5	Not connected	Not connected
6	Output Transmit Data -	Input Receive Data -
7	Not connected	Not connected
8	Not connected	Not connected

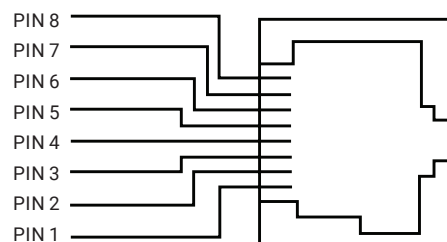


FIGURE 3-2. RJ-45 CONNECTOR

STEP 3: Connect 100BASE-FX

The Tx (transmit) port of device 1 is connected to the Rx (receive) port of device 2, and the Rx (receive) port of device 1 to the Tx (transmit) port of device 2. The fiber connector is shown below.

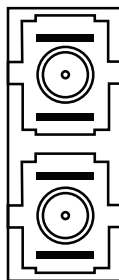


FIGURE 3-3. FIBER CONNECTOR

STEP 4: Connect the switch to your network.

Cable Type and Length

Follow the cable specifications below when connecting the switch to your network. Use the appropriate cables that meet your speed and cabling requirements.

TABLE 3-2. CABLE SPECIFICATIONS

SPEED	CONNECTOR	PORT SPEED HALF/FULL DUPLEX	CABLE	MAX
10BASE-TE	RJ-45	10/20 Mbps	2-pair UTP/STP CAT5	328 ft. (100 m)
100BASE-TX	RJ-45	100/200 Mbps	2-pair UTP/STP CAT5	328 ft. (100 m)
100BASE-FX	SC, ST	200 Mbps	MMF (50 or 62.5 μ m)	1.2 mi. (2 km)
100BASE-FX	SC, ST	200 Mbps	SMF (9 or 10 μ m)	12.4 or 24.8 mi. (20 or 40 km)
100BASE-BX	SC	200 Mbps	MMF (50 or 62.5 μ m)	1.2 or 3.1 mi. (2 or 5 km)
100BASE-BX	SC	200 Mbps	SMF (9 or 10 μ m)	12.4 or 24.8 mi. (20 or 40 km)

CHAPTER 3: INSTALLATION

STEP 5: Grounding the Unit

CAUTION: This equipment is designed to permit the connection of the grounded conductor of the DC supply circuit to the grounding conductor at the equipment.

For power connection, the following conditions must be met:

- This equipment must be connected directly to the DC supply system grounding electrode conductor or to a bonding jumper from a grounding terminal bar or bus to which the DC supply system grounding electrode conductor is connected.
- This equipment must be located in the same immediate area (such as, adjacent cabinets) as any other equipment that has a connection between the grounded conductor of the same DC supply circuit and the grounding conductor, and also the point of grounding of the DC system. The DC system should not be grounded elsewhere.
- The DC supply source must be located within the same premises as the equipment.
- Switching or disconnecting devices will not be in the grounded circuit conductor between the DC source and the point of connection of the grounding electrode conductor.

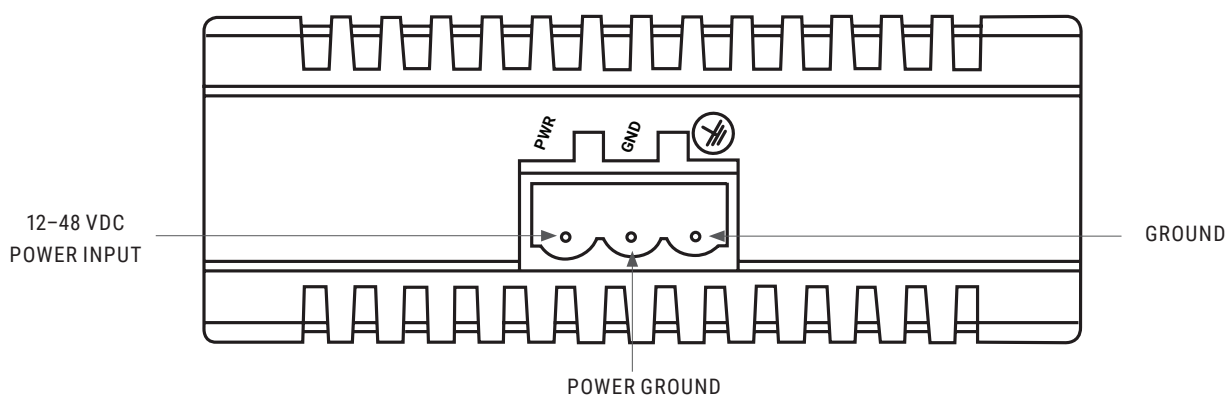


FIGURE 3-4. GROUNDING THE UNIT

Before you apply power:

1. Inspect the equipment thoroughly.
2. Verify that all cables are installed correctly.
3. Check cable routing to make sure cables are not damaged or create a safety hazard.
4. Be sure that all equipment is mounted properly and securely.

STEP 5: Apply power.

Connect the 12–48 VDC power supply voltage to start up the switch via the terminal block.

TABLE 4-1. LED INDICATORS

LED	STATE	DESCRIPTION
Link/Act	Steady	Network connection established
	Flashing	Transmitting or receiving data
100	Steady	Transfer at 100 Mbps
	Off	Transfer at 10 Mbps

APPENDIX A: REGULATORY INFORMATION

A.1 FCC STATEMENT

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.



APPENDIX A: REGULATORY INFORMATION

A.2 NOM STATEMENT

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico debe ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

APPENDIX B: DISCLAIMER/TRADEMARKS

B.1 DISCLAIMER

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

B.2 TRADEMARKS USED IN THIS MANUAL

Black Box and the Black Box logo type and mark are registered trademarks of Black Box Corporation.

Any other trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.



NOTES

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