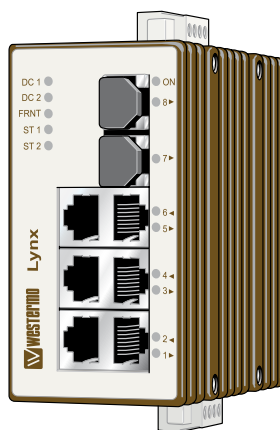




Lynx

SERIES



Industrial Ethernet 8-port Switch

Legal information

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

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

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

<http://www.westermo.com>

Safety



Before installation:

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

This unit should only be installed by qualified personnel.

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

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

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



Before mounting, using or removing this unit:

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



Class 1 Laser Product

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

Care recommendations

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

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

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

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

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

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

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

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

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

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

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

Note. Fibre Optic Handling

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

If this recommendation not will be followed it can jeopardise the warranty.

Cleaning of the optical connectors

In the event of contamination, the optical connectors should be cleaned by the use of forced nitrogen and some kind of cleaning stick.

Recommended cleaning fluids:

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

Maintenance

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

Agency approvals and standards compliance

Type	Approval / Compliance
EMC	EN 61000-6-2, Immunity industrial environments
	EN 55024, Immunity IT equipment
	EN 61000-6-3, Emission residential environments
	FCC part 15 Class B
	EN 50121-4, Railway signalling and telecommunications apparatus
	IEC 62236-4, Railway signalling and telecommunications apparatus
Safety	EN 60950-1, IT equipment

FCC Part 15.105 Notice:

This equipment 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 equipment 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 equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment 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 equipment and receiver
- ⌘ Connect the equipment 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.

Declaration of Conformity



CE Certificate of Conformity

Westermo OnTime AS declares that the listed products conform to the Council Directives and standards:
73/23/EEG Low Voltage Directive (LVD)
89/336/EEG Electromagnetic Compatibility (EMC –directive)

EN 61000-2
EN 61000-6-2
EN 61000-6-4
EN 50121-4
EN 50121-3-2 (except conducted measurement values)
EN 50155-1
EN 50155-2 all temperature classes
EN 50155-3
EN 50155-4 MTBF >180.000 hrs at 55°C (MIL2.17)
EN 50155-5 chap. 5.1: OnTime Quality Manual after ISO9001:2000 principles
chap. 5.3: not conforming according to ISO 9002
EN 50155-6
EN 50155-7 chap. 7.7: With protective coating
chap. 7.9: With wall mounting brackets
EN 50155-8 chap. 8.2: not conforming
EN 50155-9 defined documents available for customer after signing of Non-Disclosure-Agreement
EN 50155-10 chap. 10.2.11: With wall mounting brackets
IEC 60945, 8.7 Sinusoidal vibration
IEC 60068-2-6 test Fc
IEC 60068-2-64 tests Fh
IEC 60068-2-27 tests Ea
IEC 60068-2-29 tests Eb
IEC 60068-2-30 test Db
IEC 68-2-2 test Bd Dry Heat

Type of Equipment: Industrial Ethernet Switches

Models: U208, R208, T208 all versions,
Lynx series

Reference: U/R/T200 Operator Manual, Lynx Operator Manual
U/R/T200 Install Guide, Lynx Install Guide

Øyvind Holmeide, sign.
Managing Director
March 27th, 2006

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Type tests and environmental conditions

Environmental phenomena	Basic standard	Description	Test levels
EMC			
ESD	EN 61000-4-2	Enclosure contact	± 6 kV
		Enclosure air	± 8 kV
RF field AM modulated	IEC 61000-4-3	Enclosure	20 V/m 80% AM (1 kHz), 80 – 2 000 MHz
RF field 900 MHz	ENV 50204	Enclosure	20 V/m pulse modulated 200 Hz, 900 ± 5 MHz
Fast transient	EN 61000-4-4	Signal ports	± 2 kV
		Power ports	± 2 kV
Surge	EN 61000-4-5	Signal ports	± 2 kV line to earth, ± 2 kV potential difference
		Power ports	± 2 kV line to earth, ± 2 kV line to line
RF conducted	EN 61000-4-6	Signal ports	10 V 80% AM (1 kHz), 0.15 – 80 MHz
		Power ports	10 V 80% AM (1 kHz), 0.15 – 80 MHz
Power frequency magnetic field	EN 61000-4-8	Enclosure	1000 A/m, 50 Hz
Pulse magnetic field	EN 61000-4-9	Enclosure	300 A/m
Voltage dips and interruption	EN 61000-4-29	DC power ports	Voltage interruption - 3 x 30 s within 5 minutes: 19V to 0 V & 62.4 V to 0V Power supply variation - 3 x 1 minute 30% increase and 25% reduction
Radiated emission	EN 55022	Enclosure	Class B
	FCC part 15		Class B
	IEC 60945		Complying with the limit line
Conducted emission	EN 55022	Signal ports	Class B
	EN 55022	DC power ports	Class B
	IEC 60945		Complying with the limit line
Dielectric strength	EN 60950-1	Signal port to other isolated ports	1.5 kVrms 50 Hz 1 min
		Power port to other isolated ports	1.5 kVrms 50 Hz 1 min
Environmental			
Temperature		Operating	–40 to +70°C
		Storage & Transport	–50 to + 85°C
Humidity		Operating	5 to 95% relative humidity
		Storage & Transport	5 to 95% relative humidity
Altitude		Operating	2 000 m / 70 kPa
Service life		Operating	10 year
Vibration	IEC 60068-2-6	Operating	1 mm, 3 – 13.2 Hz 0.42 mm, 30 – 50 Hz 0.7 g, 13.2 – 100 Hz 4.2 g, 50 – 500 Hz 1.5 g, 5.5 – 30 Hz
	IEC 60068-2-64	Operating	0.23 g, 3 – 2000 Hz
Shock	IEC 60068-2-27	Operating	All directions: 2 g, 11 ms Z-axis: 30 g, 11 ms
Bump	IEC 60068-2-29	Operating	2 g, 11ms
Packaging			
Enclosure	UL 94	Aluminium	Flammability class V-1
Dimension W x H x D			52.5 x 100 x 101 mm
With connectors			52.5 x 119 x 101 mm
Weight			0.6 kg
Degree of protection	IEC 529	Enclosure	IP 40
Cooling			Convection
Mounting			Horizontal on 35 mm DIN-rail

Description

Lynx is a range of switches consisting of three different function levels and four different type approvals, giving you the ability to select the perfect switch for your application providing optimum functionality at the best value.

Our unique FRNT (Fast Recovery of Network Topology) technology is the fastest protocol on the market to re-configure a network in the event of any failure of a link or hardware. That is why the Lynx-series is used in safety critical applications such as tunnels, traffic signal control and railway systems.

Installations in harsh environments and places with heavy electrical interference demand the use of a reliable media. The Lynx-series provides a number of solutions using fibre optic transceivers. Multi- or singlemode transceivers can be used to build point-to-point or redundant ring networks with ranges up to 120 km between each switch. Our BIDI transceiver, which transmits and receives data on a single fibre can be used in applications where the number of fibre cores is limited.

Real-time properties are implemented in the Lynx-series in order to achieve determinism for real time critical applications. The Lynx-switches supports QoS (Quality of Service) with four priority queues and strict priority scheduling as well as HoL (Head of Line Blocking Prevention). All to assure that the data network is deterministic.

Interface specifications

Power	
Operating voltage	19 to 60 VDC
Rated current	146 mA @ 24 VDC 80 mA @ 48 VDC
Rated frequency	DC
Inrush current, I ² t	49·10 ⁻⁴ A ² s @ 48 VDC
Startup current*	250 mA @ 24 VDC
Polarity	Reverse polarity protected
Redundant power input	Yes
Isolation to	All other
Connection	Detachable screw terminal
Connector size	0.2 – 2.5 mm ² (AWG 24 – 12)
Shielded cable	Not required

* External supply current capability for proper startup

Ethernet TX	
Electrical specification	IEEE std 802.3. 2000 Edition
Data rate	10 Mbit/s, 100 Mbit/s, manual or auto
Duplex	Full or half, manual or auto
Circuit type	SELV
Transmission range	150 m, according to long cable specification
Isolation to	Power
Connection	TX connectors: RJ-45 shielded, auto MDI/MDI-X
Shielded cable	Not required, except when installed in Railway applications as signalling and telecommunications apparatus and located close to rails.
Conductive housing	Isolated to all other circuits
Number of ports	6

Ethernet SFP pluggable connections (FX or TX)	
Electrical specification	IEEE std 802.3. 2000 Edition
Data rate	100 Mbit/s, 1000 Mbit/s manual or auto
Duplex	Full or half, manual or auto
Circuit type	SELV
Transmission range	Depending on transceiver
Isolation to	Power
Connection	TX connectors: RJ-45 shielded, auto MDI/MDI-X FX connectors: LC
Shielded cable	Not required
Conductive housing	Isolated to all other circuits
Number of ports	1 or 2

Status relay	
Contact resistance	25 Ω
Isolation to	1500 VDC
Connection	Detachable screw terminal
Connector size	0.2 – 2.5 mm ² (AWG 24 – 12)

Optical Power Budget

The allowed link length is calculated from the optical power budget (OPB), the available optical power for a fibre-optic link, and the attenuation of the fibre, comprising losses due to in-line connectors, splices, optical switches and a margin for link ageing (typical 1.5 dB for 1300 nm).

The worst-case optical power budget (OPB) in dB for a fibre-optic link is determined by the difference between the transmitter's output optical power (min) and the receiver input sensitivity (max).

FX (Fibre)	SM-LC80	SM-LC40	SM-LC15	MM-LC2
Fibre connector	LC duplex	LC duplex	LC duplex	LC duplex
Fibre type	Singlemode 9/125 µm	Singlemode 9/125 µm	Singlemode 9/125 µm	Multimode, 62.5/125 and 50/125 µm
Wavelength	1550 nm	1310 nm	1310 nm	1310 nm
Transmitter Output optical power min/max	-5/0 dBm**	-5/0 dBm**	-15/-8 dBm**	-20/-14 dBm*
Receiver Input sensitivity, max	-34 dBm	-34 dBm	-31 dBm	-31 dBm
Receiver Input optical power, max	-5 dBm***	-3 dBm***	-8 dBm	-8 dBm
Optical power budget, worst-case	29 dB	29 dB	16 dB	11 dB
Transceiver type	Small Form Factor Pluggable (SFP) Multi-Sourcing Agreement (MSA) compliant			
Laser class	Class 1, IEC 825-1 Accessible Emission Limit (AEL)			

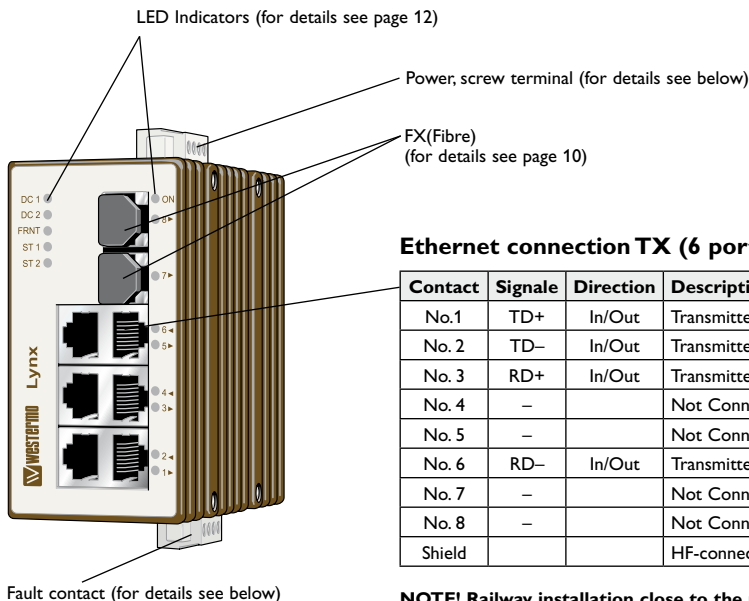
FX (Fibre)	Bi-di LC-60	Bi-di LC-40	Bi-di LC-20	Bi-di MM LC-2
Fibre connector	LC Simplex	LC Simplex	LC Simplex	LC Simplex
Fibre type	Singlemode 9/125 µm	Singlemode 9/125 µm	Singlemode 9/125 µm	Multimode 62.5/125 and 50/125 µm
Wavelength nm, connector 1	Tx 1310, rx	Tx 1310, rx	Tx1310, rx	Tx 1310, rx
Wavelength nm, connector 2	1550 Tx 1550, rx 1310	1550 Tx 1550, rx 1310	1550 TX 1550, rx 1310	1550 Tx 1550, rx 1310
Transmitter Output optical power min/max	-5/0 dBm **	-8/0 dBm **	-10/0 dBm **	-10/-8 dBm *
Receiver Input sensitivity, max	-34 dBm	-34 dBm	-28 dBm	-28 dBm
Receiver Input optical power, max	0 dBm***	0 dBm***	0 dBm	-0 dBm
Optical power budget, worst-case	29 dB	26 dB	18 dB	18 dB
Transceiver type	Small Form Factor Pluggable (SFP) Multi-Sourcing Agreement (MSA) compliant			
Laser class	Class 1, IEC 825-1 Accessible Emission Limit (AEL)			

* Output power is power coupled into a 62.5/125 µm multimode fibre

** Output power is power coupled into a 9/125 µm singlemode fibre

*** The optical power should be reduced by at least 5 dB (SM-LC80 and Bi-di LC-60) or 3dB (SM-LC-40 and Bi-di LC-40) between the optical output and input.

Location of interface ports and LED's



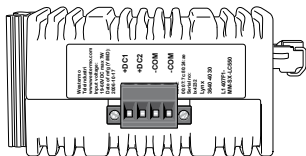
Ethernet connection TX (6 ports)

Contact	Signale	Direction	Description
No.1	TD+	In/Out	Transmitted/Received data
No. 2	TD-	In/Out	Transmitted/Received data
No. 3	RD+	In/Out	Transmitted/Received data
No. 4	—		Not Connected
No. 5	—		Not Connected
No. 6	RD-	In/Out	Transmitted/Received data
No. 7	—		Not Connected
No. 8	—		Not Connected
Shield			HF-connected

NOTE! Railway installation close to the rails.

For a cable located inside 3 m boundary and connected to this port, the use of shielded cable is recommended, this is to minimise the risk of interference. The cable shield should be properly connected (360°) to an earthing point within 1 m from this port. This earthing point should have a low impedance connection to the conductive enclosure of the apparatus cabinet, or similar, where the unit is built-in. This conductive enclosure should be connected to the earthing system of an installation and may be directly connected to the protective earth.

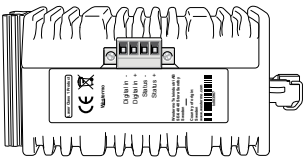
Power connection screw terminal



4-position	Description
No. 1	+DC1
No. 2	+DC2
No. 3	Common
No. 4	Common

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

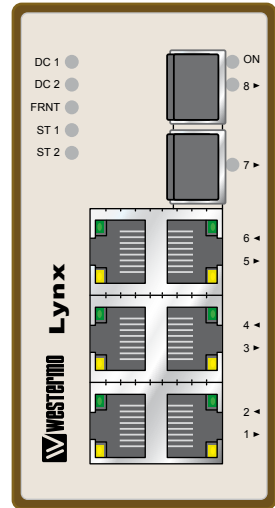
Fault contact



4-position	Description
No. 1	Alarm relay (status) +
No. 2	Alarm relay (status) -
No. 3	—
No. 4	—

LED indicators

LED	Status	Description
On	OFF	Unit has no power
	GREEN	Internal power ok
	RED	Initialisation progressing
	FLASH	Connected to IP Configuration tool
DC1	RED	Unit has no power on +DC1
	GREEN	Internal DC1 power is ok
	OFF	Unit is unconnected
DC2	RED	Unit has no power on +DC2
	GREEN	Internal DC2 power is ok
	OFF	Unit is unconnected
FRNT	OFF	FRNT is not enabled or not supported
	GREEN	FRNT is running and the switch is configured as member switch in the ring.
	GREEN FLASH	FRNT is running and the switch is configured as Focal Point
	RED	FRNT Error
ST 1	GREEN	Indicates STP root
ST 2	NC	
1 to 8	OFF	No Link
	GREEN	Good link
	GREEN FLASH	Data is transmitted
	YELLOW OFF	
	YELLOW ON	Port alarm and no linkIf RSTP mode port is blocked



Configuration

The units can easily be configured via the onboard Web based configuration tool. Local IP addresses can also be configured by using the Westernmo IP Configuration tool, from the IP Configuration tool it is then possible to browse into the unit for further configuration.

IP Address

When delivered, the default IP address of the Lynx is 192.168.2.85.

Default gateway 192.168.2.85

If the default address of the unit is valid in the connected network it is possible to access the unit directly from a web browser.

Change local IP address

The local address of Lynx can be configured using the IP Configuration tool, then it is possible to browse into the unit for further configuration. The IP Configuration program is available on the CD or for download from the WESTERMO web page:

<http://www.westermo.com>, (choose Downloads/Software/Ethernet/ Name: setup.exe

Install the software and start the application from a PC on the network connected to the same network as the Lynx. Make sure that the Default IP of the configuration software (see figure below) is in the same subnet as your PC.

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

Note! IP Config version must be 9.8.4 or higher.

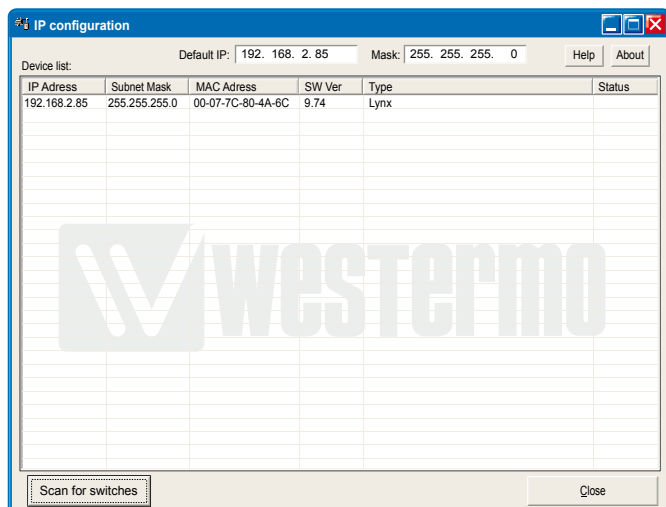


Figure 1

By clicking the “Scan for switches” button the IP Configuration tool will detect the switches/routers in the network. The software will list all Westermo managed switches or routers connected to the network. Information as in the figure 1 will appear for each detected unit connected to the same network as your PC.

If you only want to change the IP address and the subnet mask, this can be done within the IP config tool.

By clicking the listed Lynx that you wish be re-configured you will be asked if you would like to access via web figure 2. Click the abort button, enter the preferred IP address, Subnet mask and IP gateway address and click the Set button to confirm the settings in the unit (see figure 3).

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

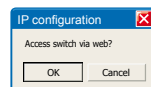


Figure 2

Click the Close button to get back to main view. You will then be asked if you would like to quit. Click the OK button, figure 4, and you will be back to the main view of the IP Configuration program(see figure 1).

Figure 3

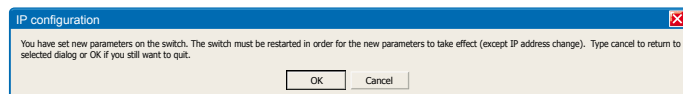
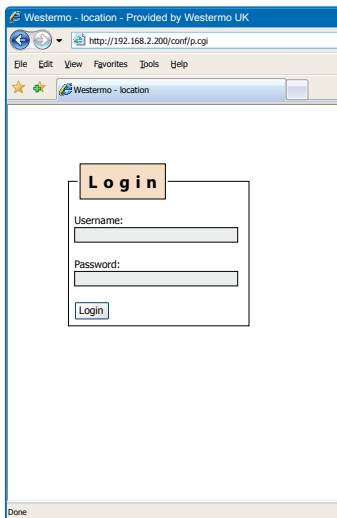


Figure 4

Click the Scan for switches button again and the settings you configured will appear in the list. Now you can access the Lynx via the browser for further configuration by clicking the unit with an IP address that fits your subnet. Figure 2 will appear and when you click the OK button and a web browser will be opened and redirected to the Lynx unit log in page (see figure 5).



Log in via Web

You will be prompted with a Login screen where the default settings for Username and Password are:

Username: admin
Password: westermo

Figure 5

The unit can be easily configured via the on-board Web based configuration tool. The network interface and switch properties can be configured and stored. The Web tool also has an extended integrated help function describing all configuration options.

Note! Max 10 characters can be used in the login.

Note! For login the following characters are not valid.

ASCII 34 = "

ASCII 35 = #

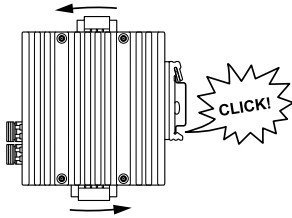
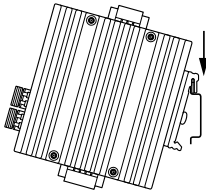
ASCII 39 = "

ASCII 40 = (

ASCII 92 = \

Mounting

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



Cooling

This unit uses convection cooling. To avoid obstructing the airflow around the unit, use the following spacing rules. Minimum spacing 25 mm (1.0 inch) above /below and 10 mm (0.4 inches) left /right the unit. Spacing is recommended for the use of unit in full operating temperature range and service life.

Removal

Press the device upwards to compress locking spring, tilt forward to unhook device from DIN-rail.



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