Lynx

One switch many solutions

westermo

One switch many solutions

Optimal Solutions

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.

Reliability

The Lynx series is designed with high MTBF figures to offer the most reliable solution in applications where temperature, vibration or other environmental criteria are critical considerations. This is just one of the reasons why the Lynx-series is used in outside applications, in mines and all kinds of offshore installations.

Redundancy

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.

Electrical Interference

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.

Efficient use of Bandwidth

It is becoming more and more common to use Ethernet to transfer video streams in surveillance and security applications. The Lynx-series supports IGMP snooping and VLAN to help achieve reliable use of bandwidth and maintain the functionality of the network. The Lynx-series can also be configured with one or two Gbit ports.

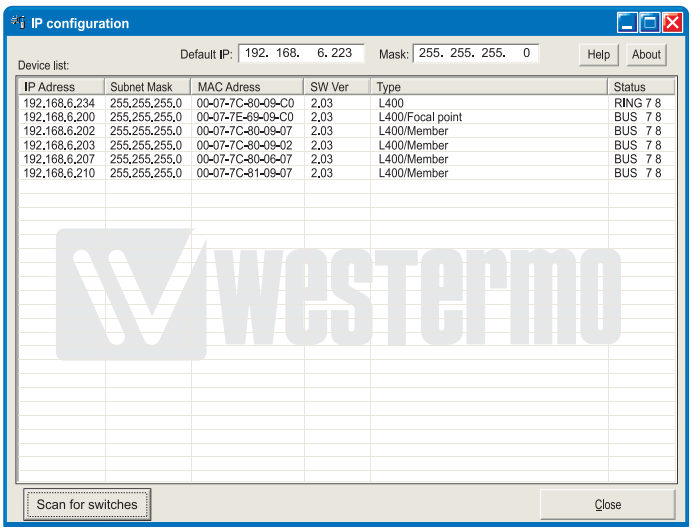
Real-time Ethernet

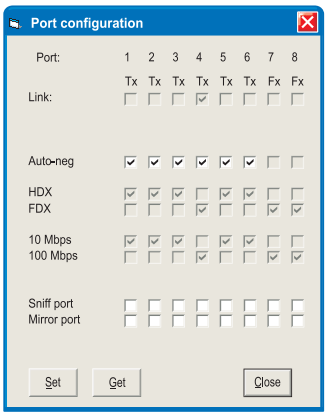
Real-time properties are implemented in the Lynx-series in order to achieve determinism for real time critical applications. The Lynx-switches supports QoS (Quality of Service) with four priority queues and strict priority scheduling as well as HoL (Head of Line Blocking Prevention). All to assure that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

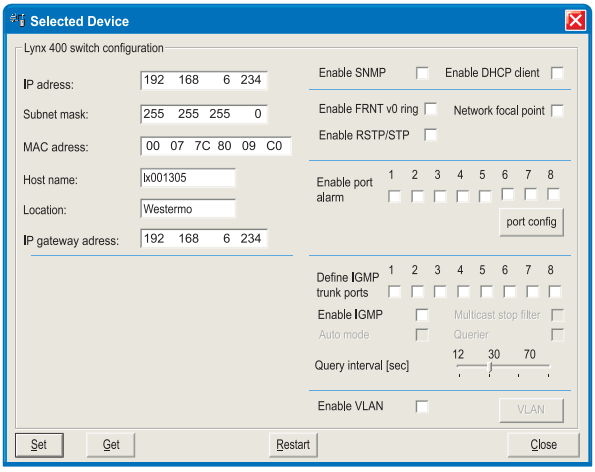
The Lynx-series – Your Natural Choice for Reliable Ethernet Solutions.

IP Configuration Tool

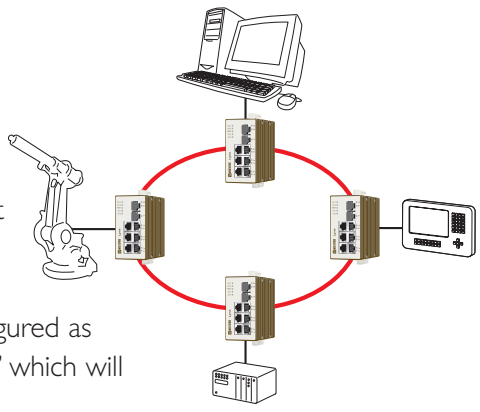
Our Windows based IP Configuration Tool makes configuration of the switches very easy. No serial port is required; just connect to any port on any switch in the network and scan for switches. All the switches will appear in the tool and it is then possible to configure each switch individually by selecting it from a table. This means that the switches can be mounted and installed in panels prior to configuration.







FRNT and Redundancy (Fast Recovery of Network Topology)



Complex networks in critical applications require redundancy and fast reconfiguration if a network fault occurs.

Our unique FRNT technology is the fastest protocol on the market to reconfigure a redundant network. FRNT is able to reconfigure a redundant ring network consisting of up to 200 switches within 20 ms, regardless of network load. All switches in the ring are configured as members of an FRNT network with one of them as a "Focal Point" which will act as a Master.

Standard protocols such as STP (Spanning Tree Protocol) take up to 25 seconds to reconfigure, even RSTP (Rapid STP) needs approximately 5 seconds to reconfigure a network. That is why STP/RSTP are not suitable for use in critical applications such as: processing, traffic/railroad signal control or any other situation that requires high reliability and availability of communications.

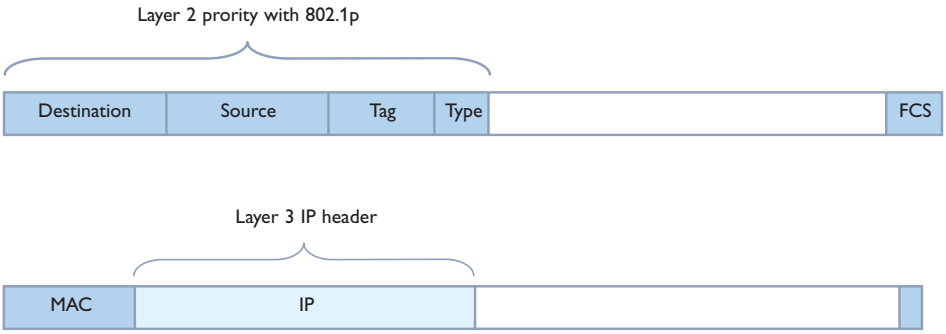
Real-Time Ethernet

Ethernet through its design is not deterministic, i.e. you cannot guarantee the transfer time of a data packet from one occasion to another. A switched network is subject to delays, which can vary from 10 µs to several ms due to the load, speed of the drop link, packet size, switch architecture and the number of switches between the server and client.

This previously made it impossible to use Ethernet for real time applications, such as monitoring transformer stations or controlling complex machinery. The features in the Lynx-series guarantee that these limitations no longer exist.

Prioritisation (QoS, Quality of Service)

The switch contains four priority queues, where the queue handling is based on strict priority scheduling in order to offer maximum determinism for real time critical and latency sensitive data. This means that high priority data always has preference over low priority data. Priority is accomplished through layer 2 tagging based on IEEE802.1p and/or layer 3 based on IP ToS.



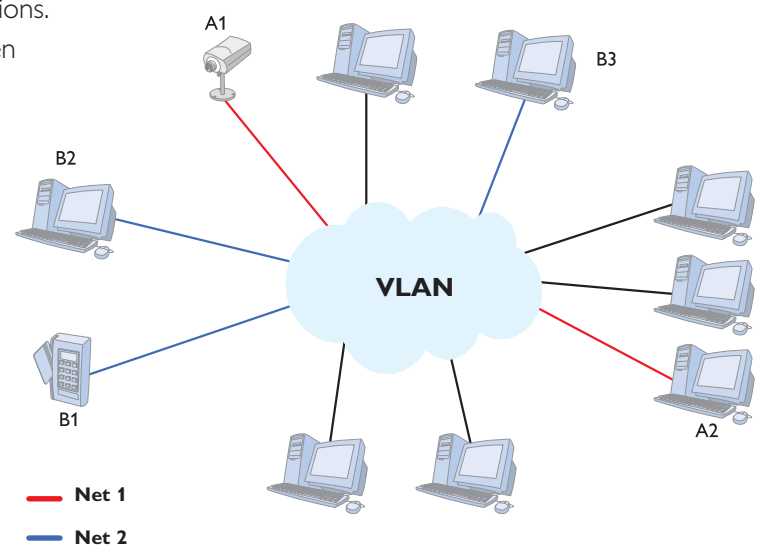
Head of Line blocking prevention

In addition Head of line blocking prevention ensures that the switch does not become congested due to bottlenecks on a port caused by a highly loaded network. This can be the case when large amounts of multicast and broadcast traffic exist on a high speed part of the network. Low speed ports are unable to transmit the data fast enough to clear their buffers.

VLAN (Virtual Local Area Network)

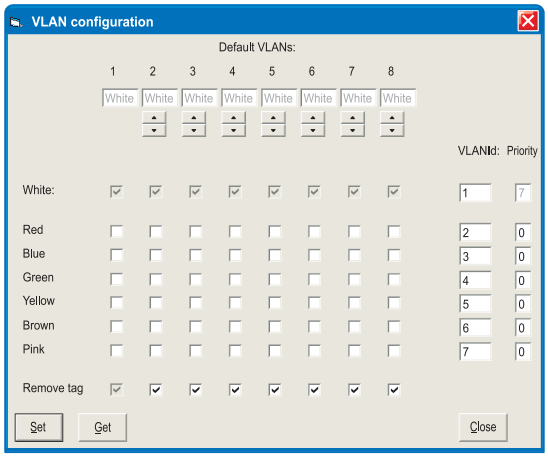
VLAN is a technique that permits virtual grouping of switches / devices in a network. There are several options; this can be done on a port level or on a MAC address level or even supplier specific solutions. The most common way previously has been to use routers to segment large networks. One drawback to using routers is that they add latency, which essentially delays the data.

The network administrator can assign a port or ports of a group of connected devices or switches to form a VLAN. VLANs overcome the limitations of a physical network. Users that belong to different logical VLANs can also have assigned different security levels, which makes each VLAN appear like a single LAN.

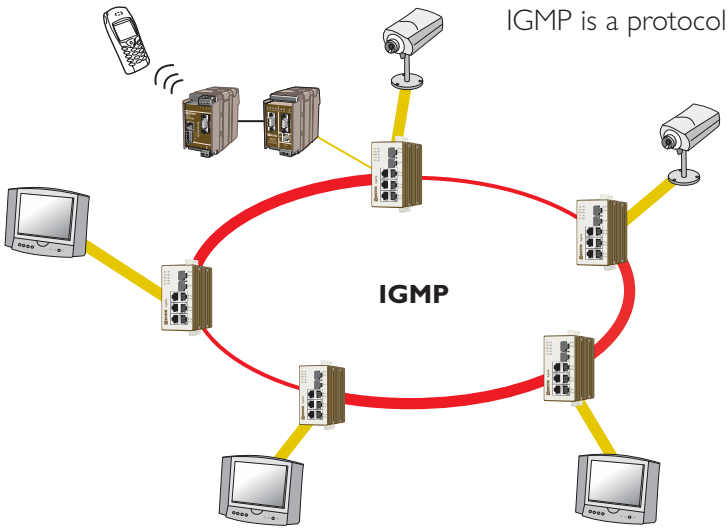


Some benefits using VLAN:

- **Higher capacity.**
  There might be users who often exchange a lot of data over the network. In order not to let these users generate too much traffic to the entire network, the administrator can confine these users in separate VLANs.
- **Increased security options.**
  The administrator can easily prohibit unauthorized users gaining access to a certain VLAN.
- **Physical topology independence.**
  Build the physical network, which then the administrator can divide into smaller networks depending on functionality/security.
- **Improved manageability.**
  No physical changes in the network are necessary when creating/changing in a VLAN.



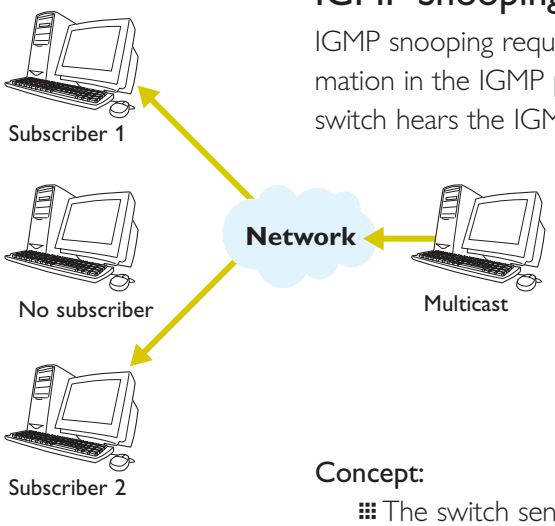
IGMP (Internet Group Management Protocol)



IGMP is a protocol used by IP hosts to dynamically register membership in Multicast groups to the closest multicast router. Multicast routers periodically send out a "Host Membership Query message" to remain updated about group membership for the local network.

In order to efficiently use the bandwidth and cut down the traffic, multicasting is the ideal solution. When data needs to be sent to a large amount of users on the network, the data will be sent simultaneously to the specified users via multicasting, and not to all users. In doing so, the bandwidth can be used more efficiently.

IGMP Snooping



IGMP snooping requires the switch to examine, or snoop, some Layer 3 information in the IGMP packets sent between the hosts and the router. When the switch hears the IGMP host report from a host for a particular multicast group, the switch adds the host's port number to the associated multicast table entry. When the switch hears the IGMP leave group message from a host, it removes the host's port from the table entry.

Concept:

- The switch sends a query message to the connected devices.
- IGMP compliant devices respond with "Join" or "Leave".
- IGMP Snooping switch edits the internal MAC database accordingly.
- Multicast Data packets are then properly being transmitted to the "subscribers".

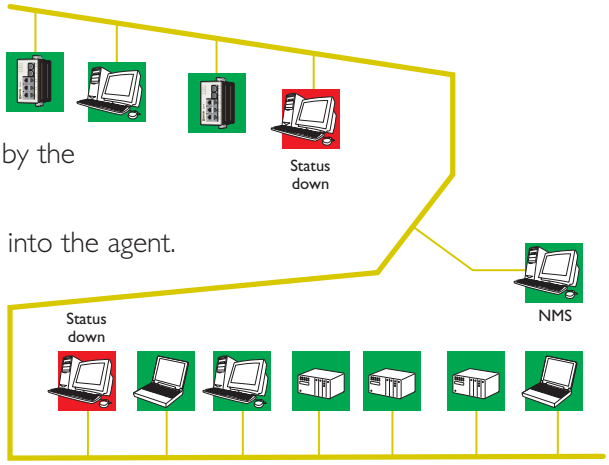
The Lynx-series has the IGMP Server (router) implemented, which means that no external IGMP server on the network is necessary. It is also integrated with the FRNT feature, which means that the multicast filters will be updated within 20 ms in case of any network failure.

Network Management

When large industrial Ethernet networks extend across multiple LANs, effective network management is a key issue for every network administrator. Automatic network management tools are required for standardized and real-time management.

SNMP (Simple Network Management Protocol)

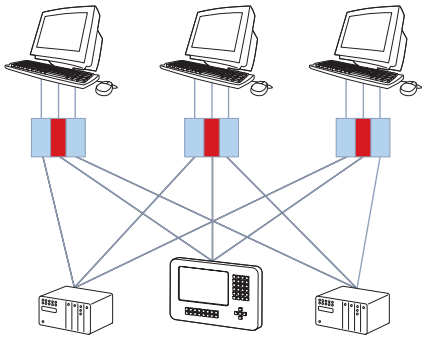
SNMP is an application layer protocol that provides a message format for communication between managers and agents. The system consists of an SNMP manager, an SNMP agent, and a management information base (MIB). The SNMP manager can be part of a network management system (NMS). The agent and MIB reside on the switch. The SNMP agent contains MIB variables, whose values can be requested or changed by the SNMP manager.



A manager can get a value from an agent or store a value into the agent. The agent gathers data from the MIB, the repository for information about device parameters and network data. The agent can also respond to a manager's requests to get or set data. An agent can send unsolicited traps to the manager. Traps are messages alerting the SNMP manager to a condition on the network. Traps can mean improper user authentication, restarts, link status (status, see picture), MAC address tracking, closing of a Transmission Control Protocol (TCP) connection, loss of connection to a neighbour, or other significant events.

OPC

An alternative to SNMP is OPC, which is an acronym for OLE for Process Control. This is a series of standards specified for information exchange within industrial automation. One of the purposes of these standards is to improve efficiency and minimise the need of supplier specific drivers. Numerous different drivers usually result in complex implementations as several applications need to interact and exchange information.



iSNMP Suite (Industrial Simple Network Management Protocol)

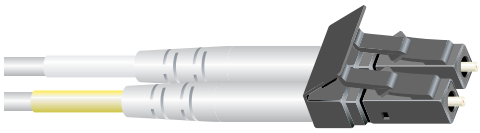
The iSNMP utility incorporates network monitoring into any OPC-client application. It is a network management and analysis software tool specially developed for the industrial market. It allows integration of monitoring and analysis of managed and unmanaged Ethernet networks into leading human-machine interface (HMI) software packages. It provides operators with a real-time view of the health of their Ethernet network devices, the overall traffic volume and the status of the network within their HMI software environments.

iSNMP™ SUITE

Models

Lynx 045	Fast Ethernet Unmanaged switch (10/100Base) for industrial networks with robust M12 connectors.
Lynx 100	Fast Ethernet Managed switch (10/100Base) for industrial networks.
Lynx 300	Fast Ethernet Managed switch (10/100Base) with network redundancy (FRNT/RSTP).
Lynx 400	Fast Ethernet Managed switch (10/100Base) with network redundancy (FRNT/RSTP), VLAN and IGMG Snooping.
Lynx 1100	Gbit Ethernet Managed switch (10/100/1000Base) for industrial networks.
Lynx 1300	Gbit Ethernet Managed switch (10/100/1000Base) with network redundancy (FRNT/RSTP).
Lynx 1400	Gbit Ethernet Managed switch (10/100/1000Base) with network redundancy (FRNT/RSTP), VLAN and IGMP Snooping.

Port combinations, select fibre according to the application



LC duplex connector is used for both multi- and singlemode.

Lynx is designed using the latest technology, a modular system that the allows devices to be equipped with fibre or copper transceivers depending on the application requirements. Variants are available for multimode and singlemode fibre and in addition there is a BIDI transceiver, which means you can install a ring solution on just one fibre.

The following fibre transceivers are available for 100 Mbit, all offer LC connection:

- Multimode 2 km (1.2 mi).
- Singlemode 15 / 40 / 85 / 120 km (9.3 / 24.9 / 52.8 / 74.5 mi).
- BIDI singlemode (Contact Westermo for distances)*.

The following fibre transceivers are available for Gbit, all offer LC connection:

- Multimode 550 m (1804 ft). Demands 50 / 125 fibre optic cable.
- Singlemode 10 / 40 / 80 / 120 km (6.2 / 24.9 / 49.7 / 74.5 mi).
- BIDI singlemode (Contact Westermo for distances)*.

* *BI-DIrectional means that a single fibre is used for both transmit and receive. BIDI is only available for single mode fibre transceivers. Up to 60 km (37.3 mi) can be supported.*

CE

Industrial IT enabled

DNV

SS-EN ISO 9001

SWEDAC ACKREDITERING 1053 EN 45012

Approval

Lynx has been developed to withstand harsh environments in different situations. Approval for applications and certification to external products are available depending on the application requirements.

The models are classified for:

- Industrial standards
- Marine
- Railway

The design is also prepared to conform to requirements for:

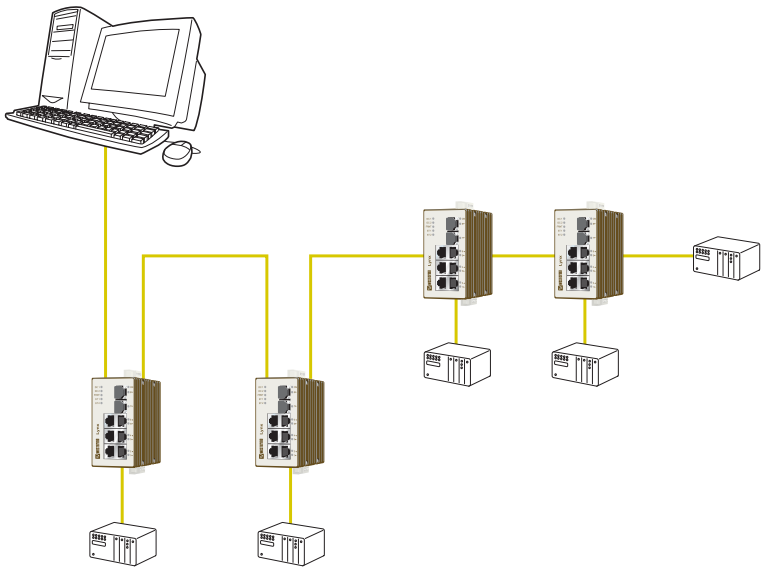
- Installation in switchgear "Substation Automation"
- Military applications

Lynx 100 / 1100

The natural choice for harsh environments

The managed Lynx 100 / 1100 fulfils the toughest industrial environmental requirements. High MTBF numbers makes it the natural choice for applications where temperature, vibration and insulation are critical parameters. The switch also has redundant power inputs to increase reliability. The switch has full support for QoS as well as HoL, which makes it suitable to use in real-time Ethernet applications.

The Lynx 1100 can be configured with either one or two Gigabit ports (Fibre / Copper).

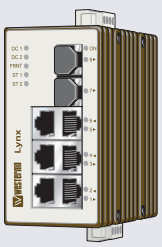


- SNMP Management.
- Real time Ethernet:
  - QoS and IPToS.
  - Four priority queues.
  - Strict priority scheduling.
  - HoL blocking prevention.
- Military design, full metal housing (IP 40).
- Wide temperature range (–40 to +70°C).
- Wide DC power range (19 to 60 VDC).
- No moving parts or electrolytic capacitors.
- Low power consumption with redundancy.
- Supports long cable 150 m (CAT5e).
- High MTBF numbers.
- Auto MDX / MDIX.
- DIN rail mounting.

Model 1xx / 11xx	06	07	08	07F1-MM 07F2-MM	07F1-SM 08F2-SM	07F1-BIDI 08F2-BIDI
10 / 100 TX	6 RJ 45	6 RJ 45	6 R J 45	6 RJ 45	6 RJ 45	6 RJ 45
100 Multimode				1 or 2 LC		
100 Singlemode					1 or 2 LC	1 or 2 LC
1000 TX		1 RJ 45	2 RJ 45			
1000 Multimode				1 or 2 LC		
1000 Singlemode					1 or 2 LC	1 or 2 LC

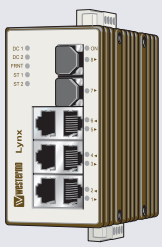
Note! 07F1 have 1 fibre optic port and 08F2 have 2 fibre optic ports available to configure.
If other fibre combination is required, please contact Westermo.

See page 18 for order information



- FRNT, v0.
- STP / RSTP (IEEE 802.1D / 1w).
- SNMP Management.
- Real time Ethernet:
  - QoS and IPToS.
  - Four priority queues.
  - Strict priority scheduling.
  - HoL blocking prevention.
- Military design, full metal housing (IP 40).
- Wide temperature range (–40 to +70°C).
- Wide DC power range (19 to 60 VDC).
- No moving parts or electrolytic capacitors.
- Low power consumption with redundancy.
- Supports long cable 150 m (CAT5e).
- High MTBF numbers.
- Auto MDX / MDIX.
- DIN rail mounting.

See page 18 for order information

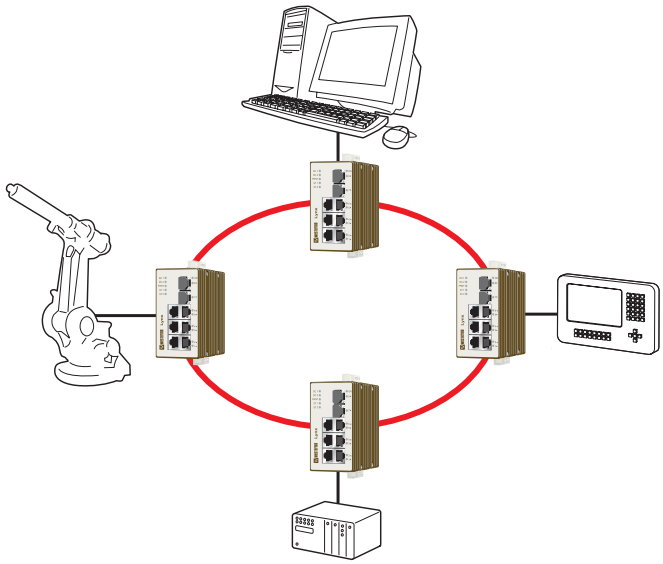


Lynx 300 / 1300

The natural choice for redundant ring solutions

The Lynx 300 / 1300 is designed for complex networks in critical applications where redundancy and fast reconfiguration in case of a network error is crucial. FRNT is able to reconfigure a redundant ring network consisting of up to 200 switches within 20 ms, regardless of network load. The Lynx 300 / 1300 also supports RSTP/STP protocol, which provides inter-operability to other RSTP/STP networks.

The Lynx 1300 can be configured with either one or two Gigabit ports (Fibre / Copper).



Model 1xx / 11xx	06	07	08	07F1-MM 07F2-MM	07F1-SM 08F2-SM	07F1-BIDI 08F2-BIDI
10 / 100 TX	6 RJ 45	6 RJ 45	6 R J 45	6 RJ 45	6 RJ 45	6 RJ 45
100 Multimode				1 or 2 LC		
100 Singlemode					1 or 2 LC	1 or 2 LC
1000 TX		1 RJ 45	2 RJ 45			
1000 Multimode				1 or 2 LC		
1000 Singlemode					1 or 2 LC	1 or 2 LC

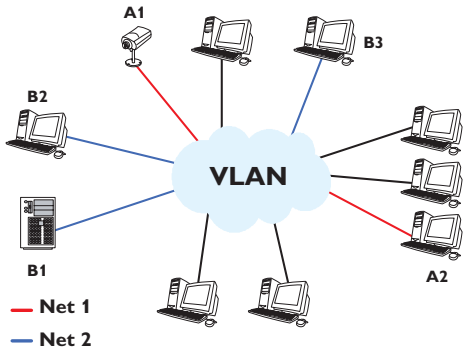
Note! 07F1 have 1 fibre optic port and 08F2 have 2 fibre optic ports available to configure.
If other fibre combination is required, please contact Westermo.

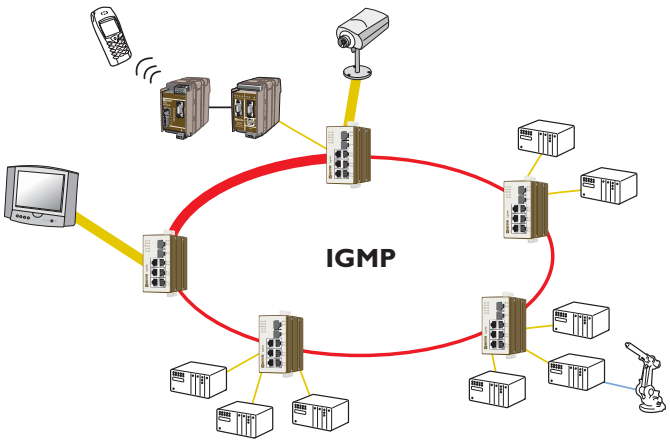
Lynx 400 / 1400

The natural choice for high security applications

The Lynx 400 / 1400 supports VLAN and IGMP protocols. The VLAN makes it possible to create smaller virtual networks within a large physical network. This feature makes it very easy for the network administrator to create smaller networks depending on network load, functionality or security level. The IGMP protocol offers the possibility for devices to "subscribe" to essential data. In doing so, the bandwidth can be used more efficiently.

The Lynx 1400 can be configured with either one or two Gigabit ports (Fibre / Copper).



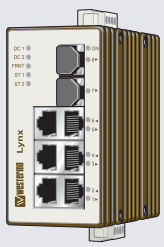


Model 1xx / 11xx	06	07	08	07F1-MM 07F2-MM	07F1-SM 08F2-SM	07F1-BIDI 08F2-BIDI
10 / 100 TX	6 RJ 45	6 RJ 45	6 R J 45	6 RJ 45	6 RJ 45	6 RJ 45
100 Multimode				1 or 2 LC		
100 Singlemode					1 or 2 LC	1 or 2 LC
1000 TX		1 RJ 45	2 RJ 45			
1000 Multimode				1 or 2 LC		
1000 Singlemode					1 or 2 LC	1 or 2 LC

Note! 07F1 have 1 fibre optic port and 08F2 have 2 fibre optic ports available to configure. If other fibre combination is required, please contact Westermo.

- VLAN (IEEE 802.1Q).
- IGMP Snooping.
- FRNT, v.0.
- STP / RSTP (IEEE. 802.1D / 1w).
- SNMP Management.
- Real time Ethernet:
  - QoS and IPToS.
  - Four priority queues.
  - Strict priority scheduling.
  - HoL blocking prevention.
- Military design, full metal housing (IP 40).
- Wide temperature range (–40 to +70°C).
- Wide DC power range (19 to 60 VDC).
- No moving parts or electrolytic capacitors.
- Low power consumption with redundancy.
- Supports long cable 150 m (CAT5e).
- High MTBF numbers.
- MAC address filtering per port.
- Auto MDX / MDIX.
- DIN rail mounting.

See page 18 for order information



Lynx Series
100/300/400/1100/1300/1400

Technical Data

Port combinations
The Lynx-series offers a wide range of port combinations.
The basic configuration is 6 TX ports.
It is then possible to configure one or two additional ports as required with:

Singlemode transceiver, LC:
15, 40, 85, 120 km
(9.3, 24.9, 52.8, 74.5 mi)
100Base FX

10, 40, 80, 120 km
(6.2, 24.9, 49.7, 74.5 mi)
100 / 1000Base FX

Singlemode transceiver BIDI, LC:
15, 30, 60 km
(9.3, 18.6, 37.3 mi)
100Base FX

10, 30, 60 km
(6.2, 18.6, 37.3 mi)
1000Base FX

Multimode transceiver, LC:
2 km (1.24 mi)
100Base FX

550m (1 800 ft)
100 / 1000Base FX

TX transceiver
100 m (328 ft)
1000BaseTX

Environmental options
The Lynx-series has several environmental approvals:

- Industrial
- Marine
- Rail
- SA, Substation*
- Defense*

* Contact Westermo for further information

Power	
	Multi- or singlemode
Rated voltage	19–60 VDC (polarity protected)
Rated current	100/300/400: 270 mA @ 24 VDC (with 2 FX interface) 1100/1300/1400: 310 mA @ 24 VDC (with 2 FX interface)
Rated frequency	DC
Connection	Detachable screw terminal

Physical dimensions (DIN clip included)	
Dimension (W x H x D)	52.5 x 100 x 101 mm (2 x 3.9 x 4 in)
Weight kg (pounds)	0.6 (1.3)

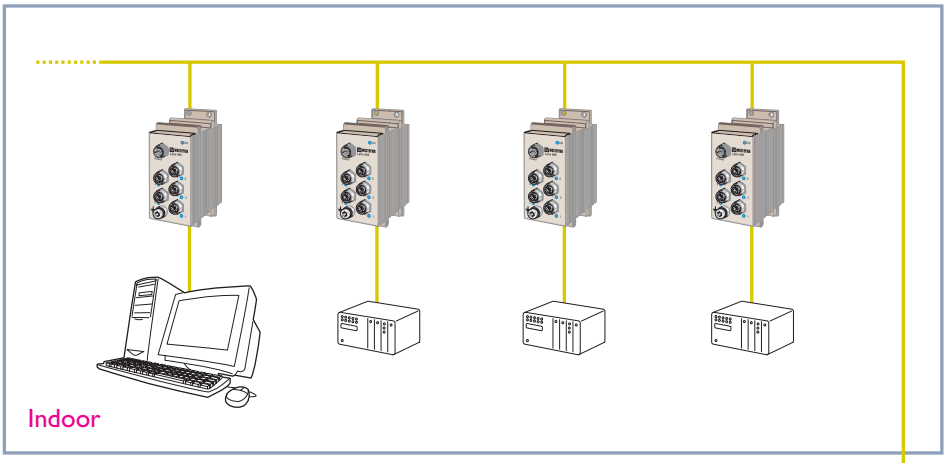
Environmental	
Enclosure	IP 40
Temperature (storage)	–40 to +85°C (–40 to +185°F)
Temperature (operational)	–40 to +70°C (40 to 120 km fibre may limit range) (–40 to +158°F) (24.9 to 74.5 mi)
Humidity	Humidity 5–95% RHD non-condensing (100% for coated version)
Altitude	2000 m (6562 ft)
EMC	EN 61000-6-2 industrial immunity EN 50081-2 industrial emission
Vibration	IEC 255-21-1 Class 1 IEC 255-21-2 Class 1
Safety	EN 60950
Maritime (optional)	Det Norske Veritas (DNV) (Equivalent to Germanischer Lloyd and ABS)
Railroad (optional)	Approved for track side and train side (on board) use

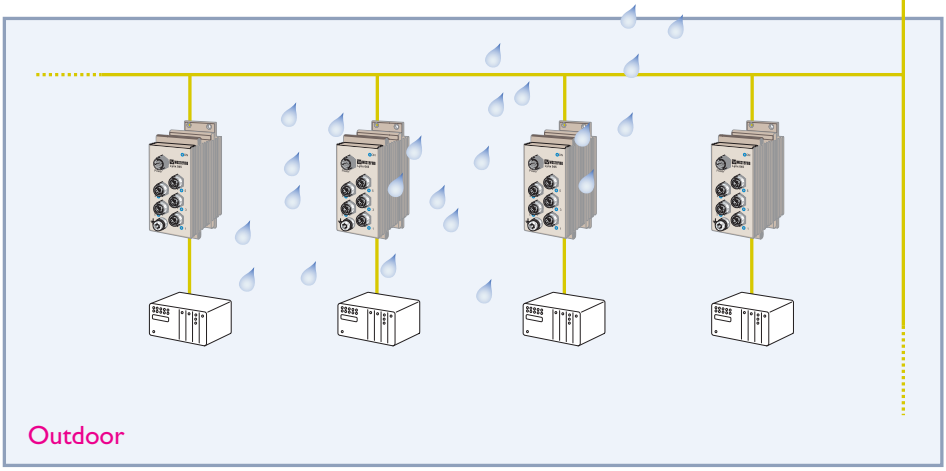
Miscellaneous	
Fault contact	Potential free electronic relay contact, glitch free switching, current rating 120 mA continuous, voltage rating 60 V. Isolation withstands 1500 Vrms basic isolation according to EN 60950. Transient protected.
LED indications	ON/FAIL LED indicates the unit's operational mode (Green: OK/ Red: fail). Port LEDs indicates green for link and flashing green for activity. Port LEDs can also indicate yellow for non-link condition on a port configured for link monitoring (active link expected). Input voltage supervision LEDs (standard power supply) indicates green for input voltage within range and red for input voltage out of range.

Lynx 045

IP 65 Industrial Ethernet Switch

The Lynx 045 unmanaged switch fulfils the toughest environmental requirements for indoor and outdoor installations. Lynx 045 have five 10/100 Mbit TX Ethernet ports with M12 connectors. High MTBF numbers, IP 65, military design and M12 connectors makes Lynx 045 the choice for applications where temperature, vibration and insulation are critical parameters. Lynx 045 is easy to install and have function for auto negotiation, auto sensing, auto crossing and auto polarity.





- Plug and Play.
  - auto negotiation.
  - auto sensing.
  - auto crossing.
  - auto polarity.
- Port alarm.
- True industrial specification:
  - Military design.
  - M12 connectors.
  - Full metal housing.
  - IP 40 or IP 65.
  - Wide temperature range.
  - Wide DC power range.
  - Low power consumption.
  - High MTBF numbers.
  - Approved for industrial, marine and railway use.
- DIN rail mounting or wall mounted.

Model 045		
Ports/Connectors		
	Ethernet 10/100Base TX	M12 D-coded
	Power and fault contact	M12 A-coded
	Earth connection	

Lynx
045

Technical Data

Power	
Rated voltage	24–110 VDC (polarity protected)
Rated current	180 mA @ 24 VDC
Rated frequency	DC
Connection	A-coded M12 connector
Earth	M5 Earth connector

Ethernet connectors
4-pole M12 female with D-code

Physical dimensions (DIN clip included)	
Dimension (W x H x D)	53 x 127 x 112 mm (2 x 5 x 4.4 in)
Weight kg (pounds)	0.7 (1.5)

Mounting
Wall mounted or DIN rail mounting

Environmental	
Enclosure	IP 40 or IP 65
Temperature (storage)	–40 to +85°C (–40 to +185°F)
Temperature (operational)	–40 to +70°C (–40 to +158°F)
Humidity	Humidity 5–95% RHD non-condensing (100% for coated version)
Altitude	2000 m (6562 ft)
EMC	EN 61000-6-2 industrial immunity EN 50081-2 industrial emission
Vibration Shock	IEC 60068-2-6 IEC 60068-2-64
Safety	EN 60950
Railroad	EN 50155

Miscellaneous	
Fault contact	Potential free electronic relay contact, glitch free switching, current rating 120 mA continuous, voltage rating 60 V. Isolation withstands 1500 Vrms basic isolation according to EN 60950. Transient protected.
LED indications	ON/FAIL RED During start up or faliure. GREEN Internal power OK. Ethernet TX ports 1–5. OFF No Ethernet link. GREEN Link is established. FLASHING Ethernet data is transmitted or received, traffic indication.

Environmental Approvals
The Lynx 045 is approved according to IP 65.

IP6x
The first digit indicates protection against ingress of foreign objects.
0 is non-protected and
6 is defined as:
A body Ø 1.0 mm (0.04 in) must not be able to enter.

IPx5
The second digit indicates protection against ingress of water.
0 is non-protected and
5 is defined as:
Water jets directed at the enclosure from any direction must not have any harmful effects.

Lynx Series
100/300/400/1100/1300/1400

Approvals

Lynx models

100/1100 SNMP management, IP address, port configuration.

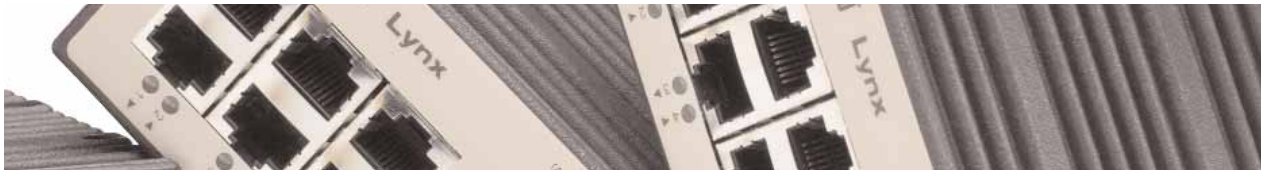
300/1300 Redundant ring, SNMP.

400/1400 VLAN, IGMP snooping.

Example: Lynx 320: 100 Mbit Switch for redundant ring, SNMP and railway approvals.

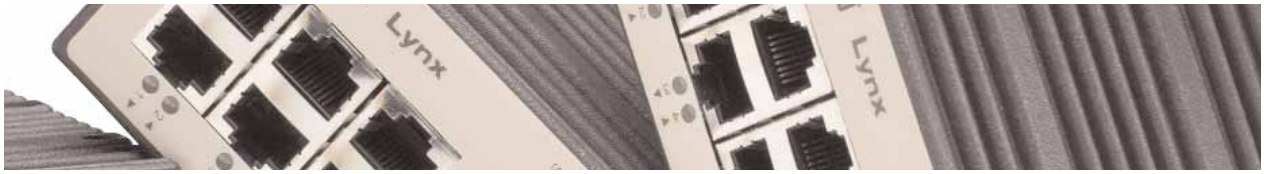
Lynx models	Industrial 00	Maritime 10	Railway 20	SA 30	MIL 40	Standard	Description
Low voltage directive LVD.	▦	▦	▦	▦	▦	73/23/EEG	
EMC Directive.	▦	▦	▦	▦	▦	89/336/EEG	
Environment							
Information technology equipment.	▦	▦	▦	▦	▦	EN 55024 (1998)	
Electromagnetic compatibility (EMC). Generic industrial applications.	▦	▦	▦	▦	▦	EN 61000-6-4 (2001)	
Railway applications (EMC).			▦ ▦		▦ ▦	EN 50121-4 (2000) IEC 62236-4 (2003)	
Maritime navigation and radio communication equipment and systems.		▦			▦	IEC 60945 Ed3 and Ed4 (1996, 2002)	
EMC							
Radiated RF field.	▦	▦	▦	▦	▦	EN 61000-4-3 Ed.2 (2002)	20 V/m 80-2000 MHz
	▦	▦	▦	▦	▦	ENV50204 (1995)	20 V/m 900 MHz
Conducted RF voltage.	▦	▦	▦	▦	▦	EN 61000-4-6 (1996) +A1 (2001)	DC port 500 V and 2 KV
Fast transient/burst.	▦	▦	▦	▦	▦	EN 61000-4-4 (1995) +A1 +A2 (2001)	2 KV Passed critera A
Electrostatic discharge (ESD).	▦	▦	▦	▦	▦	EN 61000-4-2 (1996) +A1 (1998)	6 KV Passed criteria A

Railway 20: Side track and On Board, **SA 30:** Substation Automation.



Lynx models	Industrial 00	Maritime 10	Railway 20	SA 30	MIL 40	Standard	Description
EMC							
Surge.	■	■	■	■	■	EN 61000-4-5 (1995) + A1 (2000)	DC port 500 V and 2 KV Other ports 2 KV.
							Criteria A except DC port 2 KV line to ground and Ethernet copper ports where criteria B was achived.
							Result is better than required according to standard for furter information request test report.
Power frequency magnetic field.	■	■	■	■	■	EN 61000-4-9 (1993) +A1 (2000)	1000 A/m Criteria A.
Pulsed magnetic field.	■	■	■	■	■	EN 61000-4-9 (1993) +A1 (2000)	300 A/m Criteria A.
Radiated emission.	■	■	■	■	■	CISPR 22 (1997) + A1 (2000) +A2 (2002)	
	■	■	■	■	■	EN 55022 (1998) +A1 (2000)	Class B passed.
		■			■	EN 60945	Class B passed.
Conducted emission.	■	■	■	■	■	CISPR 22 (1997) + A1 (2000) +A2 (2002)	
			■		■	EN 55022 (1998) +A1 (2000)	Class A passed (DC power) / Class B and passed Ethernet enclosure.
		■			■	EN60945	Class B passed.
Climatic							
Dry heat.	■	■	■	■	■	IEC 60068-2-2 Test Bd	+70°C 16 h Operational.
Dry heat over temp.		■	■	■	■	IEC 60068-2-2 Test Bd	+85°C 10 min Operational.
Dry heat over temp.		■	■	■	■	IEC 60068-2-2 Test Bd	+100°C 10 min. Operational restart test at high temperature passed.

Railway 20: Side track and On Board, **SA 30:** Substation Automation.



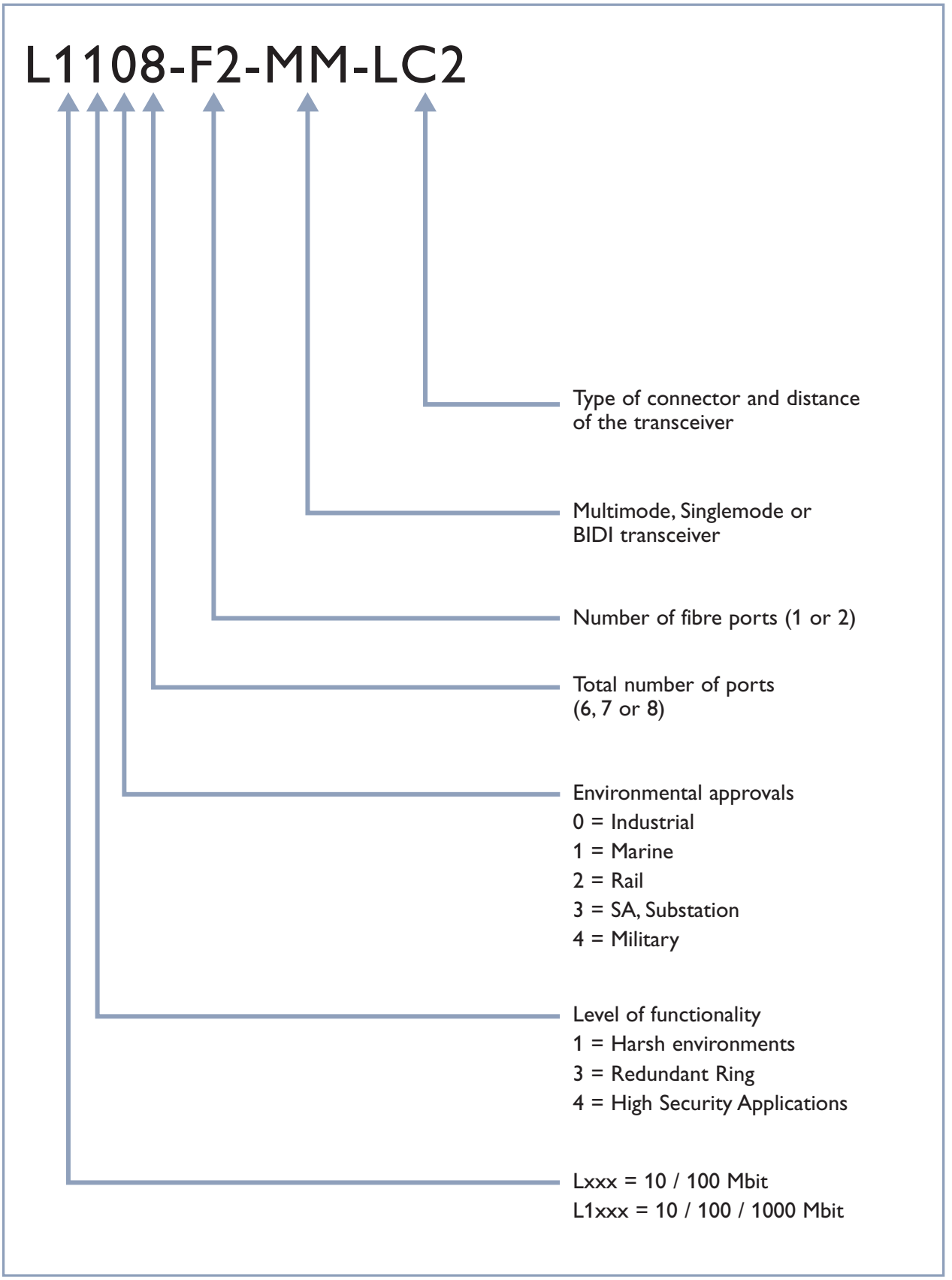
Lynx models	Industrial 00	Maritime 10	Railway 20	SA 30	MIL 40	Standard	Description
Climatic							
Cold.	■	■	■	■	■	IEC 60068-2-1 Test Ad	–40°C 16 h operational.
Cold startup.	■	■	■	■	■	IEC 60068-2-1 Test Ad	–45°C operational.
Change of temperature.	■	■	■	■	■	IEC 60068-2-14 Test Nb	–40°C to +70°C. Operational 5 cycles t=2 h 3°C/min.
Damp heat cyclic.	■	■	■	■	■	IEC 60068-2-30 Test Db variant 1	+25°C to +55°C 95%. Condensing operational 2 cycles t=24 h.
Damp heat cyclic.		■	■	■	■	IEC 60068-2-30 Test Db	+20°C / +55°C / 20°C 97%. Condensing 48h.
Mechanical							
Sinusodial vibration (according to standard level).	■	■	■	■	■	IEC 60068-2-6 Tests Fc	3-13.2 Hz ± 1 mm and 13.2 – 100 Hz 0.7 g. 1 oct/min.
Sinusodial vibration (higher level).		■	■	■	■	IEC 60068-2-6 Tests Fc	5.5-30 Hz 1.5 g 30-50 Hz 0.42 mm 50-500 Hz 4,2 g three sweep cycles.
Wide band random vibration.	■	■	■	■	■	IEC 60068-2-64 Tests Fh	3-600 Hz, 600-2000 Hz 0.23 g 100 min/axis.
Shock (according to standard level).	■	■	■	■	■	IEC 60068-2-27 Tests Ea	Half sine 2 g/11 ms 24 shocks/axis.
Shock (Higher level).			■		■	IEC 60068-2-27 Tests Ea	Half sine 30 g/11 ms 3 shocks/axis.
Bump.	■	■	■	■	■	IEC 60068-2-29 Tests Eb	Half sine 2 g/11 ms 4000 shocks/axis.
Compass safe distance.		■			■	IEC 60945	Standard 30 cm. Steering 20 cm.
			■			EN50155	Contact Westermo.
			■			EN50121-3-2	Contact Westermo.

Railway 20: Side track and On Board**, SA 30:** Substation Automation.

Additional approvals may be in effect after the printing of this manual.
Please contact Westermo for update.

Additional approvals may be offered on request.

Order information



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