



When the going gets tough on the verge of the office world:

The genuine industrial-grade Workgroup Switches MACH100/PowerLION



- Industrial-grade switch with built-in media conversion
- Available with fixed port count or as modular workgroup switches
- High quality and durability
- Low initial investment compared to solutions that need additional media converters; low ongoing costs
- ACA support Security/Authentication/VLAN, SpanningTree, etc.
- Fanless design
- Hot-swappable modules
- Hirschmann™ CLI and WEB interface
- Range of functions similar to L2P firmware: DHCP Option 82, HiDiscovery, HIPER-Ring, MRP RSTP, disable learning, SNTP; Industrial Profiles (EtherNet/IP, Profinet)
- Fully integrated in Industrial HiVision
- Temperature range: 0° C up to + 50° C

Price-conscious automation in environments closely tied to the office setup place enormous demands on hardware. Because large amounts of data have to be processed quickly, safely and flexibly – after all, data has a short expiry period. A workgroup switch must therefore meet the requirements of the office environment and above all have one thing in particular: maximum performance.

Hirschmann™ has expanded its product range with the Fast Ethernet workgroup switches of the MACH100 Family. These Switches support Profinet and EtherNet/IP protocols. This way workgroups can be net worked by copper cables and via fiber optics, and can be connected to the backbone. For this purpose 2 Gigabit Combo ports are available. The switches are offered in versions with 8 or 24 permanently installed Fast Ethernet ports, or as modular devices with 8 ports and slots for 2 additional 8 port media

modules. The switches are designed for a temperature range from 0° C up to + 50° C and support a large range of management and redundancy modes, as well as several functions for configuration and diagnostics. Further features are fanless cooling as well as an optional power supply. As a result the devices of the MACH100 Family offer a high level of security and flexibility for Ethernet network design or upgrade in production-related areas.

As Hirschmann™ is a true "boardroom to factory floor" networking company, part of the product offering includes high quality, high performance switches without the industrial ratings. The PowerLION meets the needs of IT professionals. The full-featured management and high traffic performance makes the PowerLION compatible with larger office-grade brands while maintaining an economical price. .



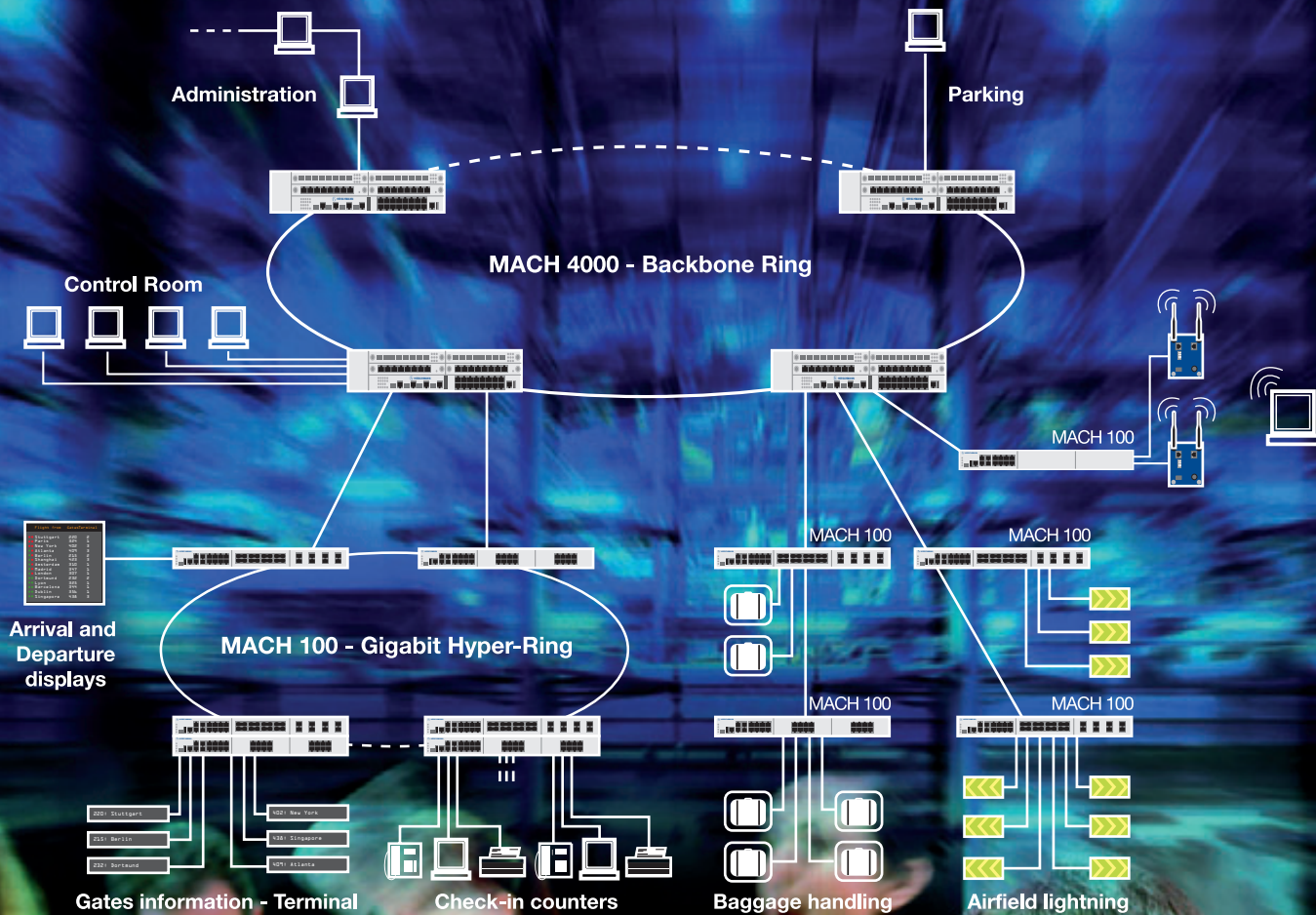
MACH100



PowerLION-24 TP

Accessories

for this family you can find on the following pages:
Transceiver Page 212
System Accessories Page 220




Hirschmann™ Competence Center

Also in the Control Room the Hirschmann™ Competence Center ensures appropriate service and support for your industrial network. With consulting offers such as **network optimization check**, **network technology evaluation** or **network baselining consulting** and trainings such as **PEd-Control Room Switches** and **XXd PowerLION**. In addition, we support you with the installation and configuration, via our service hotline and later with Advance Hardware Replacement and warranty extensions.

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Industrial Ethernet



MACH100 > Switches

Type	MACH102-8TP
Order No.	943 969-001
	 <p>26 port Fast Ethernet/Gigabit Ethernet Industrial Workgroup Switch (fix installed: 2 x GE, 8 x FE; via Media Modules 16 x FE), managed, Software Layer 2 Professional, Store-and-Forward-Switching, fanless Design</p>
Product description Port type and quantity	Up to 26 Ethernet ports, thereof up to 16 Fast-Ethernet ports via media modules realisable; 8x TP (10/100 BASE-TX, RJ45) Fast Ethernet ports and 2 Gigabit Combo ports fix installed
More Interfaces Power supply/signaling contact V.24 interface USB interface	1 x plug-in terminal block, 2-pin, output manual or automatic switchable (max. 1 A, 24 V DC bzw. 24 V AC) 1 x RJ11 socket, serial interface for device configuration 1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable Twisted pair (TP) Multimode fiber (MM) 50/125 µm Multimode fiber (MM) 62.5/125 µm Single mode fiber (SM) 9/125 µm Single mode fiber (LH) 9/125 µm (long haul transceiver)	0 - 100m Fast Ethernet: cf. SFP LWL module M-FAST SFP-MM/LC; Gigabit Ethernet: cf. SFP LWL module M-SFP-SX/LC and M-SFP-LX/LC Fast Ethernet: cf. SFP LWL module M-FAST SFP-MM/LC; Gigabit Ethernet: cf. SFP LWL module M-SFP-SX/LC and M-SFP-LX/LC Fast Ethernet: cf. SFP LWL module M-FAST SFP-SM/LC and M-FAST SFP-SM+/LC; Gigabit Ethernet: cf. SFP LWL module M-SFP-LX/LC Fast Ethernet: cf. SFP LWL modul M-FAST SFP-LH/LC; Gigabit Ethernet: cf. SFP LWL modul M-SFP-LH/LC and M-SFP-LH+/LC
Network size - cascading Line - / star topology Ring structure (HIPER-Ring) quantity switches	any 50 (reconfiguration time < 0,3 sec.)
Power requirements Operating voltage Power output in Btu (IT) h Rated current Power consumption	100 - 240 VAC, 47 - 63 Hz 41 (without media modules) 0.4 - 0.2 A 12 W (without media modules)
Software Management Diagnostics Configuration Security Redundancy functions Filter Industrial Profiles Realtime Flow control	serial Interface, web interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP LEDs, log-file, syslog, signal contact, RMON (statistic, history, alarms, events), port mirroring, topology discovery 802.1AB, cable diagnostic Command line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACD11, ACA21-USB), Watchdog configuration; integrated DHCP server Port security (IP and MAC), SNMP V3, SSH, authentication (802.1x) HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1D-2004, redundant network/ring coupling, dual homing, link aggregation QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D EtherNet/IP, PROFINET, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix SNTP server, realtime clock with energy buffer Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV), Prio (MAC/IP), Prio Mapping (TOS Layer2), Traffic Shaping (Unicast, Multicast, Broadcast) Ingress / Egress
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing) MTBF	0° - +50°C -20° - +85°C 10% to 95% 15.67 years (MIL-HDBK-217F Gb 25°C) (without media modules)
Mechanical construction Dimensions (W x H x D) Mounting Weight Protection class	448 x 310 x 44 (without fixing bracket) 19" control cabinet 3.60 kg IP20
EMC interference immunity EN 61000-4-2 electrostatic discharge (ESD) EN 61000-4-3 electromagnetic field EN 61000-4-4 fast transients (burst) EN 61000-4-5 surge voltage EN 61000-4-6 conducted immunity	4 kV contact discharge, 8 kV air discharge 10 V/m (80 - 2700 MHz) 2 kV power line, 4 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 4 kV data line 10 V (150 kHz - 80 MHz)
EMC emitted immunity FCC CFR47 Part 15 EN 55022	FCC 47 CFR Part 15 Class A EN 55022 Class A
Approvals Safety of industrial control equipment Safety of information technology equipment Safety of information technology equipment	cUL 508 (pending)

Industrial Ethernet


Switches > Versions

Type	MACH102-8TP-FR	MACH102-8TP-F
Order No.	943 969-301	943 969-201
	 <p>10 port Fast Ethernet/Gigabit Ethernet Industrial Workgroup Switch (2 x GE, 8 x FE), managed, Software Layer 2 Professional, Store-and-Forward-Switching, fanless Design, redundant power supply</p>	 <p>10 port Fast Ethernet/Gigabit Ethernet Industrial Workgroup Switch (2 x GE, 8 x FE), managed, Software Layer 2 Professional, Store-and-Forward-Switching, fanless Design</p>
Product description Port type and quantity	10 ports in total; 8x (10/100 BASE-TX, RJ45) and 2 Gigabit Combo ports	10 ports in total; 8x (10/100 BASE-TX, RJ45) and 2 Gigabit Combo ports
Power requirements Power output in Btu (IT) h Power consumption	44 13 W	41 12 W
Software Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1D-2004, redundant network/ring coupling, dual homing, link aggregation, redundant 100 - 240 VAC power supply	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1D-2004, redundant network/ring coupling, dual homing, link aggregation
Ambient conditions MTBF	18,06 years (MIL-HDBK-217F Gb 25°C)	15.67 years (MIL-HDBK-217F Gb 25°C)
Mechanical construction Weight	3.85 kg	3.60 kg

Type	MACH102-8TP-R	MACH102-24TP-F
Order No.	943 969-101	943 969-401
	 <p>26 port Fast Ethernet/Gigabit Ethernet Industrial Workgroup Switch (fix installed: 2 x GE, 8 x FE; via Media Modules 16 x FE), managed, Software Layer 2 Professional, Store-and-Forward-Switching, fanless Design, redundant power supply</p>	 <p>26 port Fast Ethernet/Gigabit Ethernet Industrial Workgroup Switch (2 x GE, 24 x FE), managed, Software Layer 2 Professional, Store-and-Forward-Switching, fanless Design</p>
Product description Port type and quantity	Up to 26 Ethernet ports, thereof up to 16 Fast-Ethernet ports via media modules realisable; 8x TP (10/100 BASE-TX, RJ45) Fast Ethernet ports and 2 Gigabit Combo ports fix installed	26 ports in total; 24x (10/100 BASE-TX, RJ45) and 2 Gigabit Combo ports
Power requirements Power output in Btu (IT) h Power consumption	44 (without media modules) 13 W (without media modules)	55 16 W
Software Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1D-2004, redundant network/ring coupling, dual homing, link aggregation, redundant 100 - 240 VAC power supply	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1D-2004, redundant network/ring coupling, dual homing, link aggregation
Ambient conditions MTBF	18.06 years (MIL-HDBK-217F Gb 25°C) (without media modules)	13.26 years (MIL-HDBK-217F Gb 25°C)
Mechanical construction Weight	3.85 kg	3.85 kg

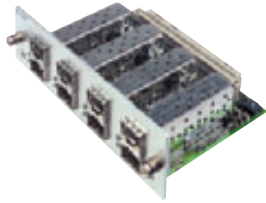
Industrial Ethernet

Switches > Versions

Type		MACH102-24TP-FR
Order No.	943 969-501	
		
	26 port Fast Ethernet/Gigabit Ethernet Industrial Workgroup Switch (2 x GE, 24 x FE), managed, Software Layer 2 Professional, Store-and-Forward-Switching, fanless Design, redundant power supply	
Product description		
Port type and quantity	26 ports in total; 24x (10/100 BASE-TX, RJ45) and 2 Gigabit Combo ports	
Power requirements		
Power output in Btu (IT) h	58	
Power consumption	17 W	
Software		
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1D-2004, redundant network/ring coupling, dual homing, link aggregation, redundant 100 - 240 VAC power supply	
Ambient conditions		
MTBF	14.93 years (MIL-HDBK-217F Gb 25°C)	
Mechanical construction		
Weight	4.10 kg	

Industrial Ethernet


MACH100 > Media modules

Type	M1-8SFP
Order No.	943 970-301
	
	Media module for modular, managed, Industrial Workgroup Switch MACH100 100 BASE-X with SFP slots
Network size - length of cable Twisted pair (TP) Multimode fiber (MM) 50/125 µm Multimode fiber (MM) 62.5/125 µm Single mode fiber (SM) 9/125 µm Single mode fiber (LH) 9/125 µm (long haul transceiver)	0 - 100m cf. SFP LWL module M-FAST SFP-MM/LC cf. SFP LWL modul M-FAST SFP-MM/LC cf. SFP LWL-Modul M-FAST SFP-SM/LC and M-FAST SFP-SM+/LC cf. SFP LWL modul M-FAST SFP-LH/LC
Power requirements Rated current Power consumption	11 W (incl. SFP module)
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing) MTBF	0° - +50°C -20° - +85°C 10% to 95% 109.33 years (MIL-HDBK-217F Gb 25°C)
Mechanical construction Dimensions (W x H x D) Mounting Weight Protection class	138 x 90 x 42 Media Module 0.13 kg IP20
EMC interference immunity EN 61000-4-2 electrostatic discharge (ESD) EN 61000-4-3 electromagnetic field EN 61000-4-4 fast transients (burst) EN 61000-4-5 surge voltage EN 61000-4-6 conducted immunity	4 kV contact discharge, 8 kV air discharge 10 V/m (80 - 2700 MHz) 2 kV power line, 4 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 4 kV data line 10 V (150 kHz - 80 MHz)
EMC emitted immunity FCC CFR47 Part 15 EN 55022	FCC 47 CFR Part 15 Class A EN 55022 Class A
Approvals Safety of industrial control equipment Safety of information technology equipment Safety of information technology equipment	cUL 508 (pending)
Scope of delivery and accessories Scope of delivery	Media module, user manual

Industrial Ethernet

Media modules > Versions

Type	M1-8TP-RJ45	M1-8SM-SC
Order No.	943 970-001	943 970-201
	 <p>Media module for modular, managed, Industrial Workgroup Switch MACH100 10/100 BASE-TX</p>	 <p>Media module for modular, managed, Industrial Workgroup Switch MACH100 100 BASE-FX Singlemode</p>
Network size - length of cable		
Multimode fiber (MM) 50/125 µm	-	-
Multimode fiber (MM) 62.5/125 µm	-	-
Single mode fiber (SM) 9/125 µm	-	0 - 32,5 km, 16 dB Link Budget at 1300 nm, A = 0,4 dB/km, 3 dB Reserve, D = 3,5 ps/(nm x km)
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-	-
Power requirements		
Power consumption	2 W	10 W
Ambient conditions		
MTBF	169.95 years (MIL-HDBK-217F Gb 25°C)	72.54 years (MIL-HDBK-217F Gb 25°C)
Mechanical construction		
Weight	0.21 kg	0.18 kg

Type	M1-8MM-SC
Order No.	943 970-101
	 <p>Media module for modular, managed, Industrial Workgroup Switch MACH100 100 BASE-FX Multimode</p>
Network size - length of cable	
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB Link Budget at 1300 nm, A = 1 dB/km, 3 dB Reserve, B = 800 MHz x km
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB Link Budget at 1300 nm, A = 1 dB/km, 3 dB Reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	-
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-
Power requirements	
Power consumption	10 W
Ambient conditions	
MTBF	68.94 years (MIL-HDBK-217F Gb 25°C)
Mechanical construction	
Weight	0.21 kg


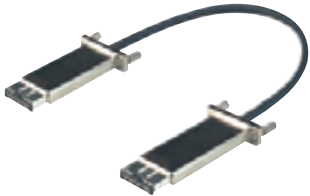
Industrial Ethernet

LION Control Room Switch > Chassis



Type	PowerLION-24 TP
Order No.	943 886-001
	 <p>Gigabit Ethernet managed switch, store-and-forward forwarding scheme</p>
Product description Port type and quantity	24 x 10/100/1000BASE-T ports (RJ-45 connectors), 4 of which are Gigabit Ethernet combo ports (RJ-45/SFP), with one optional 10GE uplink module, Layer 3
More Interfaces V.24 interface	outband management connection via V.24 (DB9 RS-232 console interface)
Network size - length of cable Twisted pair (TP) Multimode fiber (MM) 50/125 µm Multimode fiber (MM) 62.5/125 µm Single mode fiber (SM) 9/125 µm	0 - 100 m see media modules and transceivers see media modules and transceivers see media modules and transceivers
Network size - cascability Line - / star topology	any
Power requirements Operating voltage Current consumption	min. 100 V, max. 240 V, input frequency: 47 to 63 Hz max. 140 W
Service Management VLAN Security Quality of Service Other services Layer 3	SNMP v1 and SNMP v2 management functions, integration in HiVision; RMON (groups 1,2,3 and 9); web-based management; TELNET console interface; BOOTP and DHCP for IP address assignment; firmware upgraded by TFTP file transfer protocol through the Ethernet network; dual firmware images; configuration file upload/download by TFTP protocol; two or more Configuration files; system error log (syslog) IEEE 802.1Q; GVRP protocol for automatic VLAN registration and dynamic VLAN; management RADIUS client; TACACS+ client; HTTPs/SSL; Secure Shell (SSH, Secure Telnet); Access Control; IEEE 802.1x port based security L2/L3/L4Traffic ClassIPv4 routing; CoS by IEEE 802.1p 4 priority queues control; WRR for priority queues; Strict scheduling for priority queue; Rate Limiting; Random Early Detection (RED) auto-sensing, auto-negotiation on all 10/100/1000BASE-T ports up to 16 kByte memory for MAC address entries flow control mechanism: backpressure for half duplex; full duplex mode port mirroring IGMP snooping broadcast storm control QoS: DiffServ, Traffic and Bandwidth Management, 8-level priority in switching stacking: stacks up to 10 units IPv4 routing at wire speed; Static IP routes; RIP I and RIP II; OSPF routing; IP Multicast Routing; DVMRP, PIM-DM; IP Redundancy - VRRP
Redundancy Redundancy functions	IEEE 802.1D Spanning Tree Protocol IEEE 802.1w Rapid Spanning Tree IEEE 802.1s Multiple Spanning Tree link aggregation: - up to 8 ports in one trunk - up to 4 trunk groups - 802.3ad (LACP) - Ether-channel (static truck)
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing) MTBF	0 °C to +40 °C -40 °C to +70 °C 10% to 95% 19.8 years
Mechanical construction Dimensions (W x H x D) Mounting Protection class	440 mm x 44 mm x 410 mm 19" cabinet or table unit IP 20
Scope of delivery and accessories Scope of delivery Accessories to order separately	device, AC power cord, serial cable, mounting brackets, manual SFP transceivers: M-SFP-SX/LC (943 014-001), M-SFP-LX/LC (943 015-001), M-SFP-LH/LC (943 042-001) and M-SFP-LH+/LC (943 049-001) 10GE uplink: PowerLION-XM-10G (943 886-201), XENPAK-10G-LR (943 886-901) Stack cable: PowerLION-XM-C30 (943 886-401), PowerLION-XM-C130 (943 886-501)

Industrial Ethernet

LION Control Room Switch > Module

Type	PowerLION-XM-10G	PowerLION-XM-C30
Order No.	943 886-201	943 886-401
		
	10 Gigabit Ethernet uplink module for PowerLION	10 Gigabit Ethernet stacking cable for PowerLION, 30cm
Product description Port type and quantity	1 X 10 GE, XENPAK Transceiver connector	
Network size - length of cable Single mode fiber (SM) 9/125 µm	see 10 GE optical transceiver, XENPAK-10G-LR	
Power requirements Current consumption	6 W	
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing)	0 °C to +40 °C -40 °C to +70 °C 10% to 95%	0 °C to +40 °C -40 °C to +70 °C 10% to 95%
Mechanical construction Dimensions (W x H x D) Mounting	180 mm x 40 mm x 200 mm plug-in device	30cm
Scope of delivery and accessories Scope of delivery	module	stacking cable, 30 cm

LION Control Room Switch > Fiberoptic Transceiver

Type	GBIC SX	GBIC LX
Order No.	943 411-100	943 411-200
		
	GBIC transceiver for expansion module LION-GBIC 1000BASE-SX	GBIC transceiver for expansion module LION-GBIC 1000BASE-LX
Product description Port type and quantity	1 x 1000BASE-SX with duplex SC optical interface	1 x 1000BASE-LX with duplex SC optical interface
Network size - length of cable Multimode fiber (MM) 50/125 µm Multimode fiber (MM) 62.5/125 µm Single mode fiber (SM) 9/125 µm	500m 275m	10km
Power requirements Operating voltage Power consumption	via expansion module 5 W	via expansion module 5 W
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing)	0 °C to +50 °C -25 °C to +70 °C 10% to 95%	0 °C to +50 °C -25 °C to +70 °C 10% to 95%
Mechanical construction Dimensions (W x H x D) Mounting Weight Protection class	80 mm x 10 mm x 30 mm plug-in 40 g IP 20	80 mm x 10 mm x 30 mm plug-in 40 g IP 20
EMC emitted immunity FCC CFR47 Part 15 EN 55022	FCC CFR47 Part 15 Class A EN 55022 Class A	FCC CFR47 Part 15 Class A EN 55022 Class A
Scope of delivery and accessories Scope of delivery Accessories to order separately	transceiver	transceiver expansion module, order number: 943 118-605

Industrial Ethernet

LION Control Room Switch > Module

PowerLION-XM-C130	XENPAK-10G-LR
<p>943 886-501</p>  <p>10 Gigabit Ethernet stacking cable for PowerLION, 130cm</p>	<p>943 886-901</p>  <p>10 Gigabit Ethernet optical transceiver for PowerLION</p>
	1 X 10GBASE-LR, SC Duplex
	10 km
	6 W
<p>0 °C to +40 °C -40 °C to +70 °C 10% to 95%</p>	<p>0 °C to +70 °C -40 °C to +70 °C 10% to 95%</p>
130cm	<p>45 mm x 20 mm x 130 mm Transceiver for PowerLION-XM-10G uplink module</p>
stacking cable, 130 cm	transceiver