NPT 1022 Family – NPT AR1000 Series Routers

High-Capacity CPE, Access Aggregation and Cell Site Router

NPT 1022 provides support for multiple access technologies and access aggregation architectures making it ideal for operators wanting an optimized high capacity, compact CPE device, CSR, or access aggregation router. The NPT 1022 is available in modular and fixed form factors.

NPT 1022 – Modular Form Factor

The fixed form factor variants optimize cost/performance and a port fanout of 96Gb all in a compact 1 RU form factor. There are two fixed form factor variants:
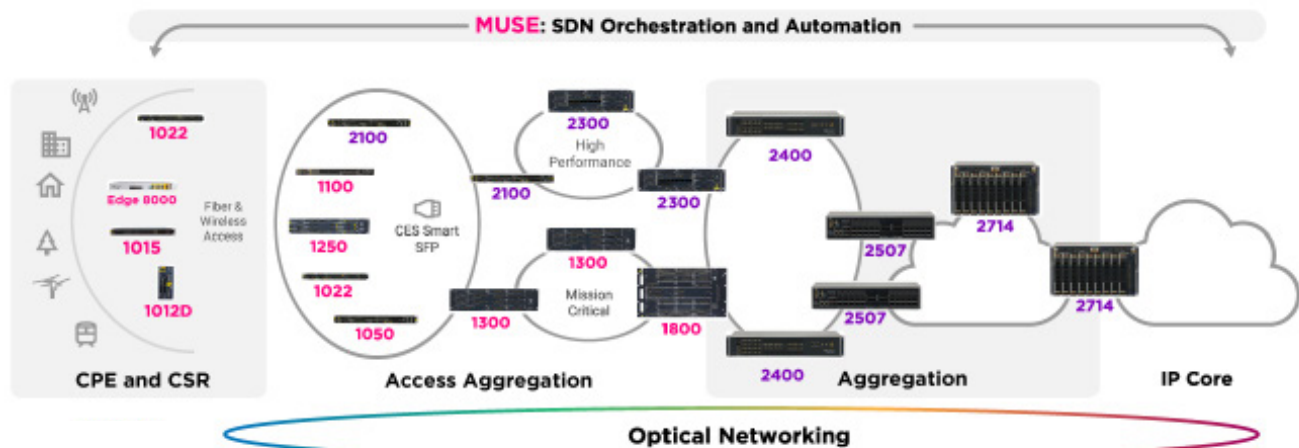
NPT 1022 – Fixed Form Factor

- NPT 1022L: supports IP/MPLS and MPLS-TP
- NPT 1022LR: supports IP/MPLS, does not support MPLS-TP or IPoDWDM

The modular form factor variants provide the flexibility to allow the operators to customize their choice of traffic card according to specific needs, with port fanout of 78G interfaces in a 1RU form factor. There are multiple modular form factor variants:

- NPT 1022: supports IP/MPLS and MPLS-TP
- NPT 1022R: supports IP/MPLS, does not support MPLS-TP or IPoDWDM
- NPT 1022H: supports IP/MPLS and MPLS-TP, adds support for partial timing G.8275.2
- NPT 1022HR: supports IP/MPLS, does not support MPLS-TP or IPoDWDM, adds support for partial timing G.8275.2
- NPT 1022BH: supports IP/MPLS and MPLS-TP with a GNSS receiver with increased memory (8G) and storage (32GB)
- NPT 1022BHR: supports IP/MPLS with a GNSS receiver with increased memory (8G) and storage (32GB), does not support MPLS-TP or IPoDWDM

The NPT 1022 is well suited for a wide variety of applications and networking scenarios, including:

- TDM migration: supporting voice trunk and legacy service migration with circuit emulation services (CES) mapping a full range of legacy TDM interface speeds onto the packet switched network (PSN)
- Access Aggregation and CPE for Business services: provides packet transport to meet service SLAs on a per service basis
- 5G Cell site router: with 5G specific functionality including Class C timing, Segment Routing, and EVPN
- Access Aggregation for Intelligent Middle Mile: supporting 5G xHaul, broadband backhaul, business services, and TDM migration all from a single converged platform
- NPT 1022BH/BHR: feature a built-in GNSS receiver and double the controller memory size
- NPT 1022HR/BHR: variants remove support for IPoDWDM and MPLS-TP

Key Product Specifications for 1022 Family Platforms

Fixed Platforms

Description	Specification	
	NPT 1022L	**NPT 1022 LR**
Chipset	• Qumran-UX	• Qumran-UX
Memory	• 8G DDR3 DRAM	• 8G DDR3 DRAM
Storage	• 32GB eMMC	• 32GB eMMC
Traffic Interfaces	• 8x1/10GE • 12x1GE • 4x10/100/1000Base-T	• 8x1/10GE • 12x1GE • 4x10/100/1000Base-T
Control and management interfaces	• USB (For SW installation and ZTI) • LCT/CLI (10/100/1000Base-T) • Console (RS232) • Alarm in/out (dry contact)	• USB(For SW installation and ZTI) • LCT/CLI (10/100/1000Base-T) • Console (RS232) • Alarm in/out (dry contact)
Performance	• 125Mpps	• 125Mpps
Power Supplies	• 2 hot-swappable AC/DC power supplies with 1+1 redundancy	• 2 hot-swappable AC/DC power supplies with 1+1 redundancy
Cooling	• 1 modular hot-swappable fan control module (4 fans) • Airflow – right to left	• 1 modular hot-swappable fan control module (4 fans) • Airflow – right to left
Timing	• SyncE with ESMC • 1588v2 • Built-in GNSS receiver • External timing 1PPS and TOD • Internal stratum 3 clock (holdover state) • Primary and secondary sources (supports SSM bits) • ACR, DCR • Loop timing, SYS Timing and PSN Timing on SAToP • NTP • Supported profiles: • G.8262.1, G.8275.1, G.8275.2 • G.8273.2 - class C	• SyncE with ESMC • 1588v2 • Built-in GNSS receiver • External timing 1PPS and TOD • Internal stratum 3 clock (holdover state) • Primary and secondary sources (supports SSM bits) • ACR, DCR • Loop timing, SYS Timing and PSN Timing on SAToP • NTP • Supported profiles: • G.8262.1, G.8275.1, G.8275.2 • G.8273.2 - class C
Physical Specifications	• 1RU • Dimension: 483 mm (W) x 243 mm (D) x 44 mm (H) • Weight: 3.5Kg	• 1RU • Dimension: 483 mm (W) x 243 mm (D) x 44 mm (H) • Weight: 3.5Kg

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Key Product Specifications for 1022 Family Platforms

Modular Platforms

Description	Specification					
	NPT 1022	**NPT 1022R**	**NPT 1022H**	**NPT 1022HR**	**NPT 1022BH**	**NPT 1022BHR**
Chipset	• Qumran- UX	• Qumran- UX	• Qumran- UX	• Qumran- UX	• Qumran- UX	• Qumran- UX
Memory	• 4G DDR3 DRAM	• 4G DDR3 DRAM	• 4G DDR3 DRAM	• 4G DDR3 DRAM	• 8G DDR3 DRAM	• 8G DDR3 DRAM
Storage	• 8GB eMMC	• 8GB eMMC	• 8GB eMMC	• 8GB eMMC	• 32GB eMMC	• 32GB eMMC
Traffic Interfaces	• 4 x 10/100/1000 Base-T • 12 x 100/1000 Base-X • 4 x 10/1GE	• 4 x 10/100/1000 Base-T • 12 x 100/1000 Base-X • 4 x 10/1GE	• 4 x 10/100/1000 Base-T • 12 x 100/1000 Base-X • 4 x 10/1GE	• 4 x 10/100/1000 Base-T • 12 x 100/1000 Base-X • 4 x 10/1GE	• 4 x 10/100/1000 Base-T • 12 x 100/1000 Base-X • 4 x 10/1GE	• 4 x 10/100/1000 Base-T • 12 x 100/1000 Base-X • 4 x 10/1GE
Control and management interfaces	• USB (For SW installation and ZTI) • LCT/CLI (10/100/1000Base-T) • Console (RS232) • Alarm in/out (dry contact)	• USB (For SW installation and ZTI) • LCT/CLI (10/100/1000Base-T) • Console (RS232) • Alarm in/out (dry contact)	• USB (For SW installation and ZTI) • LCT/CLI (10/100/1000Base-T) • Console (RS232) • Alarm in/out (dry contact)	• USB (For SW installation and ZTI) • LCT/CLI (10/100/1000Base-T) • Console (RS232) • Alarm in/out (dry contact)	• USB (For SW installation and ZTI) • LCT/CLI (10/100/1000Base-T) • Console (RS232) • Alarm in/out (dry contact)	• USB (For SW installation and ZTI) • LCT/CLI (10/100/1000Base-T) • Console (RS232) • Alarm in/out (dry contact)
Performance	• 64Gbps	• 64Gbps	• 64Gbps	• 64Gbps	• 64Gbps	• 64Gbps
Power Supplies	• 2 hot swappable with 1+1 redundancy	• 2 hot swappable with 1+1 redundancy	• 2 hot swappable with 1+1 redundancy	• 2 hot swappable with 1+1 redundancy	• 2 hot swappable with 1+1 redundancy	• 2 hot swappable with 1+1 redundancy
Cooling	• 1 Fan • Airflow – right to left • Integrated Air Filter	• 1 Fan • Airflow – right to left • Integrated Air Filter	• 1 Fan • Airflow – right to left • Integrated Air Filter	• 1 Fan • Airflow – right to left • Integrated Air Filter	• 1 Fan • Airflow – right to left • Integrated Air Filter	• 1 Fan • Airflow – right to left • Integrated Air Filter
Timing	• SyncE with ESMC • 1588v2 • Built-in GNSS receiver • External timing 1PPS and TOD • Internal stratum 3 clock (holdover state) • Primary and secondary sources (supports SSM bits) • ACR, DCR • Loop timing, SYS Timing and PSN Timing on SAToP • NTP • Supported profiles: • G.8262.1, G.8275.1, G.8275.2 • G.8273.2 - class C	• SyncE with ESMC • 1588v2 • Built-in GNSS receiver • External timing 1PPS and TOD • Internal stratum 3 clock (holdover state) • Primary and secondary sources (supports SSM bits) • ACR, DCR • Loop timing, SYS Timing and PSN Timing on SAToP • NTP • Supported profiles: • G.8262.1, G.8275.1, G.8275.2 • G.8273.2 - class C	• SyncE with ESMC • 1588v2 • External timing 1PPSand TOD • Internal stratum 3 clock (holdover state) • Primary and secondary sources (supports SSM bits) • ACR, DCR • Loop timing on SAToP, BITS (T3/4) and SNTP • Supported profiles: • G.8262.1, G.8275.1, G.8275.2 • G.8273.2 - class C	• SyncE with ESMC • 1588v2 • External timing 1PPS and TOD • Internal stratum 3 clock (holdover state) • Primary and secondary sources (supports SSM bits) • ACR, DCR • Loop timing on SAToP, BITS (T3/4) and SNTP • Supported profiles: • G.8262.1, G.8275.1, G.8275.2 • G.8273.2 - class C	• SyncE with ESMC • 1588v2 • Built-in GNSS receiver • External timing 1PPS and TOD • Internal stratum 3 clock (holdover state) • Primary and secondary sources (supports SSM bits) • ACR, DCR • Loop timing on SAToP, and SNTP • Supported profiles: • G.8262.1, G.8275.1, G.8275.2 • G.8273.2 - class C	• SyncE with ESMC • 1588v2 • Built-in GNSS receiver • External timing 1PPS and TOD • Internal stratum 3 clock (holdover state) • Primary and secondary sources (supports SSM bits) • ACR, DCR • Loop timing on SAToP, and SNTP • Supported profiles: • G.8262.1, G.8275.1, G.8275.2 • G.8273.2 - class C
Physical Specifications	• 1RU • Dimension: 483 mm (W) x 243 mm (D) x 44 mm (H) • Weight: 3.21Kg	• 1RU • Dimension: 483 mm (W) x 243 mm (D) x 44 mm (H) • Weight: 3.21Kg	• 1RU • Dimension: 483 mm (W) x 243 mm (D) x 44 mm (H) • Weight: 3.21Kg	• 1RU • Dimension: 483 mm (W) x 243 mm (D) x 44 mm (H) • Weight: 3.21Kg	• 1RU • Dimension: 483 mm (W) x 243 mm (D) x 44 mm (H) • Weight: 3.21Kg	• 1RU • Dimension: 483 mm (W) x 243 mm (D) x 44 mm (H) • Weight: 3.21Kg

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Multi-access Capabilities NPT 1022 Fixed Platforms

Description	Specification	
	NPT 1022L	**NPT 1022 LR**
L2/L3 VPN Services	• L2VPN - MEF 3.0 (IP-MPLS and MPLS-TP) 　• E-Line 　• E-LAN 　• E-Tree 　• E-Access • Ethernet Virtual Private Network (EVPN) 　• Virtual Private Wire Service (EVPN-VPWS, EVPN-ELINE) 　• • Virtual Private LAN Services (EVPN-VPLS, EVPN-ELAN) 　• Anycast IRB with IPv4 and IPv6 support 　• Multihoming – Active-Active, Single-Flow Active, Port-Active 　• PW Virtual Ethernet Segment • L3VPN 　• IPv4 VRF 　• 6VPE 　• IRB, PHT	• Ethernet Virtual Private Network (EVPN) 　• Virtual Private Wire Service (EVPN-VPWS, EVPN-ELINE) 　• Virtual Private LAN Services (EVPN-VPLS, EVPN-ELAN) 　• Anycast IRB with IPv4 and IPv6 support 　• Multihoming – Active-Active, Single-Flow Active, Port-Active 　• PW Virtual Ethernet Segment • L3VPN 　• IPv4 VRF 　• 6VPE 　• IRB, PHT
Optical Interfaces	• CWDM, • DWDM, • Amplifiers	• Not Applicable
TDM Services	• Circuit Emulation Services (CES) by smartSFP 　• SAToP 　• TSoP	• Circuit Emulation Services (CES) by smartSFP 　• SAToP 　• TSoP
TDM Pluggables	• 1 x E1/T1 (per smart SFP) • 1 x STM-1/OC-3 (per smart SFP) • 1 x STM-4/OC-12 (per smart SFP) • 1 x STM-16/OC-48 (per smart SFP)	• 1 x E1/T1 (per smart SFP) • 1 x STM-1/OC-3 (per smart SFP) • 1 x STM-4/OC-12 (per smart SFP) • 1 x STM-16/OC-48 (per smart SFP)

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Multi-access Capabilities NPT 1022 Modular Platforms

Description	Specification	
	NPT 1022, NPT 1022H, NPT 1022BH	**NPT 1022R, NPT 1022HR, NPT 1022BHR**

L2/L3 VPN Services	• L2VPN - MEF 3.0 (IP-MPLS and MPLS-TP)
	   • E-Line
	   • E-LAN
	   • E-Tree
	   • E-Access
	• Ethernet Virtual Private Network (EVPN)
	   • Virtual Private Wire Service (EVPN-VPWS, EVPN-ELINE)
	   • Virtual Private LAN Services (EVPN-VPLS, EVPN-ELAN)
	   • Anycast IRB with IPv4 and IPv6 support
	   • Multihoming – Active-Active, Single-Flow-Active, Port-Active
	   • PW Virtual Ethernet Segment
	• L3VPN
	   • IPv4 VRF
	   • 6VPE
	   • IRB, PHT
		• Ethernet Virtual Private Network (EVPN)
		   • Virtual Private Wire Service (EVPN-VPWS, EVPN-ELINE)
		   • Virtual Private LAN Services (EVPN-VPLS, EVPN-ELAN)
		   • Anycast IRB with IPv4 and IPv6 support
		   • Multihoming – Active-Active, Single-Flow-Active, Port-Active
		   • PW Virtual Ethernet Segment
		• L3VPN
		   • IPv4 VRF
		   • 6VPE
		   • IRB, PHT

Optical Interfaces	• CWDM, • DWDM, • Amplifiers	• Not Applicable

TDM Services	• Circuit Emulation Services (CES)
	   • SAToP
	   • CESoPSN
	   • CEP
		• Circuit Emulation Services (CES)
		   • SAToP
		   • CESoPSN
		   • CEP

TDM Pluggables	• E1/T1 • E3/DS3 • STM-1/OC-3 • STM-4/OC-12 • STM-16/OC-48 • 1 x STM-16/OC-48 (per smart SFP)	• E1/T1 • E3/DS3 • STM-1/OC-3 • STM-4/OC-12 • STM-16/OC-48 • 1 x STM-16/OC-48 (per smart SFP)

TDM Interfaces	• Max. Interfaces:
	   • 32 x E1/T1
	   • 24 x E3/DS3
	   • 4 x STM-1/OC-3
	   • 1 x STM-4/OC-12
	   • 1 x STM-16/OC-48 (per smart SFP)
		• Max. Interfaces:
		   • 32 x E1/T1
		   • 24 x E3/DS3
		   • 4 x STM-1/OC-3
		   • 1 x STM-4/OC-12
		   • 1 x STM-16/OC-48 (per smart SFP

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Software features provided by the Ribbon's IP Wave rNOS

Description	Specification	
	NPT 1022, NPT 1022H, NPT 1022BH, NPT 1022L	**NPT 1022R, NPT 1022HR, NPT 1022BHR, NPT 1022LR**
Layer 2	• Layer 2 forwarding and bridging • Bridge Domains (BD) • Flexible VLAN-Tagging • IEEE 802.1Q VLANs and Q-in-Q • Ethernet Link Aggregation Group (LAG) • Link Aggregation Control Protocol (LACP) 802.3ad • G.8032 • Spanning Tree Protocol • Jumbo frames on all ports	• Layer 2 forwarding and bridging • Bridge Domains (BD) • Flexible VLAN-Tagging • IEEE 802.1Q VLANs and Q-in-Q • Ethernet Link Aggregation Group (LAG) • Link Aggregation Control Protocol (LACP) 802.3ad • G.8032 • Spanning Tree Protocol • Jumbo frames on all ports
Layer 3	• IPv4 and IPv6 unicast routing • Layer 3 interfaces: physical interfaces and logical interfaces (Units). • Virtual Routing and Forwarding (VRF) • Open Shortest Path First (OSPFv2, OSPFv3) • Intermediate System to Intermediate System (ISIS) • Multiprotocol Border Gateway Protocol (MP-BGP) • Equal-Cost Multipath (ECMP) • Bidirectional Forwarding Detection (BFD), MH-BFD • Virtual Router Redundancy Protocol (VRRP) • Integrated Routing Bridging (IRB), Anycast IRB • Pseudowire Headend Termination (PHT)	• IPv4 and IPv6 unicast routing • Layer 3 interfaces: physical interfaces and logical interfaces (Units). • Virtual Routing and Forwarding (VRF) • Open Shortest Path First (OSPFv2, OSPFv3) • Intermediate System to Intermediate System (ISIS) • Multiprotocol Border Gateway Protocol (MP-BGP) • Equal-Cost Multipath (ECMP) • Bidirectional Forwarding Detection (BFD), MH-BFD • Virtual Router Redundancy Protocol (VRRP) • Integrated Routing Bridging (IRB), Anycast IRB • Pseudowire Headend Termination (PHT)
MPLS	• Label switching (LER, LSR) • Label Distribution Protocol (LDP) • BGP Labeled Unicast (BGP-LU) • MPLS-TP • MPLS Traffic Engineering with RSVP-TE, SR-TE • Point-to-point L2VPN – Static, T-LDP, EVPN-VPWS • Multipoint L2VPN – VPLS, EVPN • EVPN with Anycast IRB • 6VPE • IP Loop-Free Alternate (LFA) Fast Reroute (FRR) • RSVP-TE Fast Reroute (FRR) and Path-Protection	• Label switching (LER, LSR) • Label Distribution Protocol (LDP) • BGP Labeled Unicast (BGP-LU) • MPLS Traffic Engineering with RSVP-TE, SR-TE • Point-to-point L2VPN – Static, T-LDP, EVPN-VPWS • Multipoint L2VPN – VPLS, EVPN • EVPN with Anycast IRB • 6VPE • IP Loop-Free Alternate (LFA) Fast Reroute (FRR) • RSVP-TE Fast Reroute (FRR) and Path-Protection

Segment Routing (SR)	• SR-MPLS
	• ISIS, OSPF, BGP extensions to segment routing
	• TI-LFA
	• Segment Routing Traffic Engineering (SR-TE, SR Policies)
	   • PCE, PCC initiated SR Policies
	   • Path Protection
	   • TI-LFA Local Repair Protection
	   • Anycast SID
	   • Binding SID
	• SR, SR-TE OAM
	• Flexible Algorithm
	• BGP Color Extended Community
		• SR-MPLS
		• ISIS, OSPF, BGP extensions to segment routing
		• TI-LFA
		• Segment Routing Traffic Engineering (SR-TE, SR Policies)
		   • PCE, PCC initiated SR Policies
		   • Path Protection
		   • TI-LFA Local Repair Protection
		   • Anycast SID
		   • Binding SID
		• SR, SR-TE OAM
		• Flexible Algorithm
		• BGP Color Extended Community

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Software features provided by the Ribbon's IP Wave rNOS (continued)

Description	Specification	
	NPT 1022, NPT 1022H, NPT 1022BH, NPT 1022L	**NPT 1022R, NPT 1022HR, NPT 1022BHR, NPT 1022LR**
Multicast	• IPv4 and IPv6 Multicast Routing • PIM-SM, PIM-SSM, PIM-ASM • IGMPv3, MLDv2 • MSDP • Anycast RP • BGP IPv4 Multicast	• IPv4 and IPv6 Multicast Routing • PIM-SM, PIM-SSM, PIM-ASM • IGMPv3, MLDv2 • MSDP • Anycast RP • BGP IPv4 Multicast
Quality of Service (Qos)	• Class-based 3-level Hierarchical QoS • Virtual Output Queueing (VOQ) • Policing, Shaping • Multi-level priority queuing • Classification based on L2/L3/L4 fields • Remarking • Weighted Random Early Detection (WRED) • Deep packet buffer	• Class-based 3-level Hierarchical QoS • Virtual Output Queueing (VOQ) • Policing, Shaping • Multi-level priority queuing • Classification based on L2/L3/L4 fields • Remarking • Weighted Random Early Detection (WRED) • Deep packet buffer

OAM	• Ethernet OAM
	   • IEEE802.3ah
	   • IEEE 802.1ag
	   • ITU-T Y.1731 PM
	• IP OAM
	   • BFD
	   • Ping
	   • Trace-route
	   • TWAMP
	• MPLS-TP OAM - G8113.2, RFC5860, BFD
	• MPLS OAM – Ping/Traceroute MPLS
	• RFC 2544 Generator, Y.1564
	• LLDP
	• DHCP Relay
	• Streaming Telemetry
	• sFlow
	• Link Delay-Measurement
		• Ethernet OAM
		   • IEEE802.3ah
		   • IEEE 802.1ag
		   • ITU-T Y.1731 PM
		• IP OAM
		   • BFD
		   • Ping
		   • Trace-route
		   • TWAMP
		• MPLS OAM – Ping/Traceroute MPLS
		• RFC 2544 Generator, Y.1564
		• LLDP
		• DHCP Relay
		• Streaming Telemetry
		• sFlow
		• Link Delay-Measurement

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Software features provided by the NPTs IP-Wave rNOS (continued)

Description	Specification
Security	• Control-plane and management plane protection • Authentication, Authorization, and Accounting (AAA) • RADIUS • Terminal Access Controller Access-Control System Plus (TACACS+) • Secure Shell (SSH) • Layer 2 and Layer 3 ingress Firewall filters (ACL) • Unicast Reverse Path Forwarding (Unicast RPF) • IEEE802.1x
Manageability	• CLI • LCT • SNMP MIB • NETCONF/gRPC - XML, JSON, GPB • YANG models - OpenConfig, IETF • Muse software suite (SDN orchestration and control) • LightSOFT® NMS • Zero-Touch Provisioning (ZTP)

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Environmental

Description	Specification
Operating environment and altitude	• -25°C to +65°C
Operating humidity	• 5% to 95%
Altitude	• Up to 4000 m
Acoustics	• NEBS GR-63-CORE
Power over Ethernet (PoE+)	• Up to 30W
Power input	• -40 VDC to -72 VDC, 110 VAC to 230 VAC
Power dissipation	• 50W

Standards compliance

Description	Specification
Regulatory Compliance	• Products comply with CE markings according to directives 2014/30/EC and 2014/35/EC
NEBS	• Designed to meet GR-63, GR-1089 and GR-3160
Safety	• IEC 62368-1 (2nd edition) • UL 62368-1 • IEC 60825-1 for lasers • IEC 60825-2 for lasers
EMC Standards	• FCC CFR 47 Part 15 Subpart B ANSI C63.4 • IEC 61850-3 • IEEE 1613 • ETSI EN 50121-4 • IEC 62236-4 • FTZ 1TR9
EMC Immunity	• ETSI EN 300 386 • IEC 61000-4 series

ETSI / Environmental	• ETSI EN 300 019
	  • Storage: Class 1.1
	  • Transportation: Class 2.3
	  • In-Use/Operational: Class 3.1
	• QM 333
	• ETSI EN 300 753

RoHS	• Compliance per EU RoHS, RoHS 2 directive 2011/65/EU and amendment 2015/863/EU directives.

Specifications subject to change without notice

Contact Us Contact us to learn more about Ribbon solutions.

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