I(P)GS-5400-2P-PT

4 Modular Slots Industrial L2+ IEC61850-3 Managed (PoE) Switch

- *IEC 61850-3 & IEEE1613 compliance*
- *High-density 28 x Gigabit Ethernet L2+ managed (PoE at/af) switch*
- *Enhanced G.8032 ring protection < 20ms for single ring. Supports auto mode, enhanced mode, train mode and basic mode; Enhanced G.8032 ring covers multicast packets; MSTP 8/16* MSTI /RSTP*
- *Support LACP link aggregation, IGMP v3/router port, DHCP server & DHCP Option82 for Port/VLAN based DHCP distribution, Mac based DHCP server, QoS by VLAN, SSH/SSL, HTTPS, ACL*
- *Support relay contact & environmental monitoring*
- *Miss-wiring avoidance Node failure protection*
- *User friendly UI, including auto topology drawing and DDM threshold monitoring with dB values****
- *Support USB dongle for automatic backup configuration*

OVERVIEW

Lantech I(P)GS-5400-2P-PT is a high performance L2 + managed industrial IEC 61850 switch which provides L2 wire speed and advanced security function for network aggregation and backbone deployment. It delivers ITU G.8032 enhanced ring recovery less than 20ms including train ring, enhanced mode for easy configuration and aggregation ring*, comprehensive QoS, QoS by VLAN, advanced security including ACL L2/L3, SSH/SSL, Mac based DHCP server, DHCP Option 82, DHCP server, IGMPv1/v2/v3/router port, QinQ (double tag VLAN) which are important features required in train and large network. It also supports Cisco Discovery Protocol (CDP) and LLDP for Ciscoworks to detect the switch info and show on L2 map topology.

The built-in MMS (Manufacturing Messaging Specification) server can help SCADA to monitor and control switch by data modeling. The highly flexible modular design consisting of maximum 24x Gigabit T+4Giga/100M SFP,24x Giga PoE at/af (IPGS-5400-2P)+4Giga/100M SFP, 28xGigabit/100M SFP, 18x100M ST/SC + 4 Gigabit SFP covers the widest deployment of applications.

Lantech I(P)GS-5400-2P-PT features enhanced G.8032 ring which can be self-healed in less than 20ms for single ring topology protection covering Multicast packets. It also supports various ring topologies that covers double ring, multi-chain (under enhanced ring), train ring, basic ring by easy setup than others. The innovative auto-Ring configurator (auto mode) can calculate owner and neighbor in one step. It supports MSTP that allows RSTP over Vlan for redundant links with 8/16* MSTI.

The I(P)GS-5400-2P-PT also embedded several features for stronger and reliable network protection in an easy and intuitive way. When the pre-set ring configuration failed or looped by miss-wiring, Lantech I(P)GS-5400-2P-PT is able to alert with the LED indicator and send out an email or traps. Node failure protection ensures the switches in a ring to survive after power breakout is back. The status can be shown in NMS when each switch is back. This feature prevents the broken ring and keep ring alive without any re-configuration needed. Loop protection is also available to prevent the generation of broadcast storm when a dumb switch is inserted in a closed loop connection.

DHCP server can assign dedicated IP address by MAC or by port (Port based for single switch), it also can assign IP address by port for multiple switches with single DHCP option82 server. For the ending device which need to download file from TFTP server, DHCP Option66 server can offer IP address of TFTP server to DHCP client. Optional basic IPv6 DHCP service can be supported.

The user friendly UI, innovative auto topology drawing and topology demo makes I(P)GS-5400-2P-PT much easier to get hands-on. The I(P)GS-5400-2P-PT supports DMI interface that can correspond with DDM SFPs (Digital diagnostic monitor) to display the five parameters in Lantech's UI, including optical output power, input power, temperature, laser bias current and transceiver supply voltage**. The TX power/RX power raw data is automatically converted to dB values for installer, making it

easier to calculate the fiber distance.

The configuration file can also be exported in text file so that it can be edited and configured back to switch with ease for mass deployment. The factory reset button can reset the setting back to factory default and built-in watchdog design can automatically reboot the switch when cpu is found dead. I(P)GS-5400-2P-PT can automatically back up the configuration without any notebook setup or write the configuration into USB dongle with ease.

QoS by VLAN can allow switch to tag QoS by VLAN regardless the devices acknowledge QoS or not in which greatly enhance the bandwidth management in a network.

The environmental monitoring can detect switch temperature, voltage, current and total PoE load (IPGS-5400-2P) where can send the SNMP traps and email when abnormal.

The PoE modules support advanced PoE management including PoE detection and scheduling. PoE detection can detect if the connected PD is hang up then restart the PD; PoE scheduling is to allow pre-set power feeding schedule upon routine time table. Per port PoE status display the information of voltage, current, watt and PoE temperature.

The I(P)GS-5400-2P-PT DIDO function can support additional open/close physical contact for designate applications besides Port / Power events, for example, DIDO function can trigger alarm if the switch was moved or stolen. In case of events, the I(P)GS-5400-2P-PT will immediately send an email to pre-defined addresses as well as SNMP Traps out. It provides 2DO while disconnections of the specific port was detected and relay contact will activate the alarm. 2 DI can integrate the sensors into the auto alarm system and transfer the alarm information to IP network with email and SNMP trap.

Lantech I(P)GS-5400-2P-PT chassis and modules are designed for easy maintenance and installation; It also supports dual power supplies (DC12~48V/ isolated 36~75VDC) and (isolated 85~265VAC/100~370VDC) to increase the network reliability. It also supports terminal block for connecting DC 48V PoE power source.

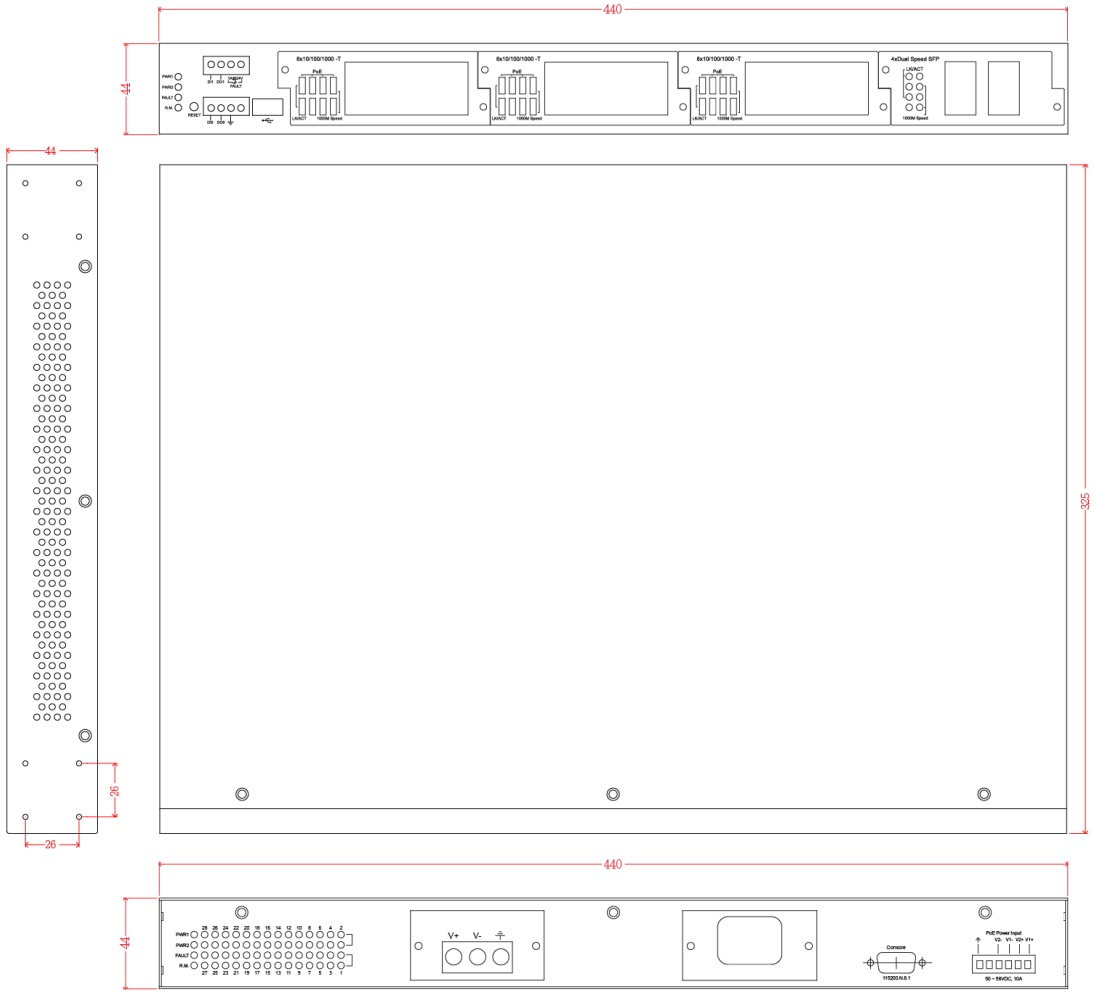
Lantech I(P)GS-5400-2P-PT features high reliability and robustness compliant with IEC-61850-3 & IEEE 1613 withstanding extensive EMI/RFI phenomenon, ±4KV surge, inductive load switching, high ESD (±8K contact/ 15K air), ± 4KV EFT, high fault current environment usually found in Substation, Steel automation, Mining and Process control etc. IGS-5400-2P-E can run under operational temperature ranging from -40°C~75°C in the harsh and critical environment.

FEATURES & BENEFITS

- **System Interface/Performance**
  - *IEC-61850 & IEEE1613 Compliance*
  - *maximum 24x Gigabit T+4xSFP,24x Giga PoE at/af+4xSFP (IPGS-5400-2P), 28xGigabit/100M SFP, 18x100M ST/SC + 4 Gigabit SFP*
  - *16K MAC Address Table*
  - *Backplane : 56Gbps*
  - *Dual Power Supplies for isolated 1600V LDC(36V~75V)*
  - *Dual Power Conversions for isolated 4000 V HV(85V~265VAC/100V~370VDC)*
  - *Dual power supply terminal block for non-isolated power DC(12V~57V)*
  - *Rear terminal block for PoE power source(DC48V) for IPGS-5400-2P*
  - *Various modules available incl. Gigabit/100M SFP ; Gigabit T ;PoE at/af Giga T(up to 30W@) ; 100MST/SC modules*
  - *FAN less design*
- **MMS server built-in for SCADA monitoring/control**
- **10KB jumbo frame supported on all ports**
- **User friendly UI, Auto topology drawing, topology demo**
- **IPv6/v4 supported**
- **Enhanced G.8032 Ring protection in 20ms < 256 switches**
  - *Support various ring/chain topologies, including train ring& aggregation ring**
  - *Enhanced G.8032 ring configuration with ease*
  - *Auto ring configuration (auto mode) for single ring*
  - *Ring covers multicast on different ports*
- **Aggregation ring for ring redundancy and bandwidth combination***
- **DDM to support SFP diagnostic function*****
  - *Automatically convert the raw data into dB values for TX power/RX power, making it easier to measure the fiber distance*
- **256 groups MSTP over VLAN**
- **VLAN**
  - *4K 802.1Q Vlan, Port Based VLAN, GVRP, QinQ*
- **Port Trunk with LACP 14 trunks with automatic link failover**
- **LACP link aggregation to add bandwidth**
- **QoS (Quality of Service)**
  - *Supports IEEE 802.1p CoS*
  - *Per port provides 8 priority queues*
  - *Port-base,Tag-base and TOS Priority*
  - *Strict priority and WRR*
- **Security**
  - *SSL/SSH/ACL L2&L3*
  - *MAC address table: MAC address entries/Filter/MAC-Port binding*
  - *IP Security: IP address security management to prevent unauthorized intruder.*
  - *Management access control with priority*
  - *Login Security: IEEE802.1X/RADIUS*
  - *HTTPS for secure access to the web interface*
- **Miss-wiring avoidance**
  - *LED indicator*
  - *Email or traps notification*
- **Node failure protection**
  - *Ensure the switches in a ring to survive after power breakout is back*
  - *The status can be shown in NMS when each switch is back*
- **IGMPv1,v2,v3 with Query mode for multimedia; GMRP**

- **IGMP router to select another Query mode and support IGMP static routing for reversed IGMP flow to bind with port for IP surveillance application**
- **Supports IEEE802.1ab LLDP, Cisco CDP**
- **DHCP server / client / DHCP Option 82 relay / DHCP Option 82 server for Port/VLAN based DHCP distribution**
- **Mac based DHCP server to assign IP address that includes dumb switches in DHCP network**
- **Bandwidth Control**
  - *Ingress Packet Filter and Egress Rate Limit*
  - *Broadcast/Multicast Packet Filter Control*
- **System Event Log, Email alert and SNMP Trap for alarm support**
- **Environmental sensor built-in to detect temperature, voltage, current and total PoE load (IPGS-5400-2P) and send out SNMP traps and emails if there is abnormal events**
- **TFTP/FTP Firmware upgradable**
- **Reset / Factory default button to restore factory setting**
- **Watch dog design to reboot switch if CPU is found dead**
- **Provides EFT protection ±4K VDC for power line**
- **Supports ±8KV contact & 15KV air Ethernet ESD protection**
- **2 DI/DO and 1 relay contact alarm**
- **Support USB dongle for automatic backup / easily write configuration**

DIMENSIONS (unit=mm)



SPECIFICATION

Hardware Specification

IEEE Standards	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Ethernet IEEE 802.3ab 1000Base-T Ethernet IEEE 802.3z Gigabit Fiber IEEE 802.3x Flow Control Capability ANSI/IEEE 802.3 Auto-negotiation IEEE 802.1Q VLAN IEEE 802.1p Class of Service IEEE 802.1X Access Control IEEE 802.1D Spanning Tree IEEE 802.1w Rapid Spanning Tree IEEE 802.1s Multiple Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.1AB Link Layer Discovery Protocol (LLDP) IEEE 802.1x User Authentication (Radius) IEEE 802.3af/at PoE(IPGS)
Switch Architecture	Back-plane (Switching Fabric): 56Gbps
Transfer Rate	14,880pps for Ethernet port 148,800pps for Fast Ethernet port 1,488,000pps for Gigabit Ethernet / Gigabit Fiber port
CPU	Marvell 800Mhz
RAM	256M Byte
Flash	128M Byte
MAC Address	16K MAC address table
Jumbo frame	10KB on all ports
Connectors	Max. 24 10/100/1000T RJ-45 with auto MDI/MDI-X+4 SFP sockets Max 28 100M Mini-GBIC : SFP sockets Max 28 1000M Mini-GBIC : SFP sockets RS-232 console: Female DB-9 USB for automatic backup and easy write up configuration
Protocol	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green), Alarm (Red) ,R.M (Green) Link/Activity (Green), Full duplex/collision(Yellow)), MINI GBIC (Link/Activity)(Green)
Power Supply	2 X VAC/VDC isolated 4000V 85V~265VAC/100~370VDC 2x LDC isolated 1600V 36~75VDC Dual input for 12V~57VDC PoE power dual input for 48VDC(IPGS-5400-2P)
Power Consumption	17.5 W@LDC, 21.5W @VAC
PoE Budget	Max. 720W at rear side with dual 48VDC input
Relay Alarm	Provides one relay output for port breakdown, power fail and alarm. Alarm Relay current carry ability: 1A @ DC24V
DI/DO	2 Digital Input (DI) : Level 0: -30~2V / Level 1: 10~30V Max. input current:8mA 2 Digital Output(DO): Open collector to 40 VDC, 200mA
Case Dimension	19" Metal case,IP-30; 440mm(W)x325mm(D)x44mm(H)
Weight	2.9 kgs
Operating Humidity	5%~95% (Non-condensing)
Operating	Standard: -20°C ~60°C
Temperature	-E model: -40°C ~75°C
Storage Temperature	-40°C ~85°C
EMI	FCC Class A, CE EN55032 Class A, CE EN55024, CE EN61000-4-2, CE EN61000-4-3, CE EN61000-4-4, CE EN61000-4-5, CE EN61000-4-6, CE EN61000-4-8, CE EN61000-4-11, CE EN61000-6-2, CE EN61000-6-4, CE EN61000-6-5
MTBF	572,361hrs
Stability Testing	IEC60068-2-32 (Free fall), IEC60068-2-27 (Shock), IEC60068-2-64 (Vibration), IEC60870-2-2, IEC60068-2-30
Railway verification	EN50121-4
Power Automation	IEC 61850-3 , IEEE 1613 , IEC 60255-5
Warranty	5 years

Software Specification

Management	SNMP v1 v2c, v3/ Web/Telnet/CLI Management
SNMP MIB	RFC 1213 MIBII RFC 1158 MIBII RFC 1157 SNMP MIB, RFC 1493 Bridge MIB, RFC 1573 IF MIB Partial RFC 1643 EtherLike, Partial RFC 1757 RMON, RFC 2674 Q-Bridge MIB RFC 2790 Host Resource MIB LLDP MIB* Private MIB
VLAN	Port based VLAN, up to 28 groups IEEE802.1Q Tag VLAN Static VLAN groups up to 256, Dynamic VLAN group up to 2048, VLAN ID from 1 to 4096. GVRP up to 256 groups** Multicast VLAN Registration*, QinQ
Port Trunk with LACP	LACP Port Trunk: 8 Trunk groups/Maximum 24 trunk members Aggregation ring for ring redundancy and bandwidth combination*
LLDP	Support LLDP to allow switch to advise its identification and capability on the LAN
CDP	Cisco Discovery protocol for topology mapping
ITU G.8032	Support ITU G.8032 v2/2012 for Ring protection in less than 20ms for self-heal recovery (basic mode) Support various ring/chain topologies Includes train ring & aggregation ring* Enhanced G.8032 ring configuration with ease Ring covers multicast on different ports
User friendly UI	■ Auto topology drawing ■ Topology demo ■ Auto configuration for G.8032(auto mode) ■ DDM threshold monitoring with dB values***
PoE Management(IPGS-5400-2P)	■ PoE Detection to check if PD is hang up then restart the PD ■ PoE Scheduling to On/OFF PD upon routine time table ■ Per port PoE status to display info of current, voltage, watt and temperature
Spanning Tree	Support IEEE802.1d Spanning Tree,IEEE802.1w Rapid Spanning Tree, IEEE 802.1s MSTP

Quality of Service	The quality of service determined by port, Tag and IPv4 Type of service, IPv4 Differentiated Services Code Points - DSCP
Class of Service	Support IEEE802.1p class of service, per port provides 8 priority queues
QoS by VLAN	Tagged QoS by VLAN for all devices in the network
IP Security	Supports 10 IP addresses that have permission to access the switch management and to prevent unauthorized intruder.
Port Mirror	Support 3 mirroring types: "RX, TX and Both packet"
IGMP	Support IGMP snooping v1,v2,v3; 1024 multicast groups; IGMP router port ; IGMP query; GMRP, QinQ
Bandwidth Control	Support ingress packet filter and egress packet limit. The egress rate control supports all of packet type, the limit rates are 0~100Mbps. Ingress filter packet type combination rules are Broadcast/Multicast/Flooded Unicast packet, Broadcast/Multicast packet, Broadcast packet only and all types of packet. The packet filter rate can be set from 0 to 100Mbps The packet filter rate can be set an accurate value through the pull-down menu for the ingress packet filter and the egress packet limit.
Network Security	Support 10 IP addresses that have permission to access the switch management and to prevent unauthorized intruder. 802.1X access control for port based and MAC based authentication/MAC-Port binding Management access control with priority 256 Policy based Access Control List SSL/ SSH for Management HTTPS for secure access to the web interface for Authentication
IPv6/v4	Present

Flow Control	Support Flow Control for Full-duplex and Back Pressure for Half-duplex
Protection	■ Miss-wiring avoidance ■ Node failure protection ■ Loop protection
System Log	Support System log record and remote system log server
SMTP	Support 1 SMTP Server and 6 e-mail accounts for receiving event alert
SNMP Trap	Up to 3 Trap stations Cold start, Port link up, Port link down, Authentication Failure, PoE event, Private Trap for power status, DI/DO open/close, ,
DHCP	Provide DHCP Client/ DHCP Server / DHCP option 82 / DHCP relay agent
Mac based DHCP Server	Assign IP address by Mac that can include dumb switch in DHCP network
DNS	Provide DNS client feature and support Primary and Secondary DNS server.
IEC 61850-9-4	Built in MMS server for data modeling for power SCADA
RTC	Built-in real time clock to keep track of time always
Environmental Monitoring	Internal sensor to detect temperature, voltage ,current , total PoE budget (IPGS-5400-2P-PT) and send SNMP traps and emails if any abnormal events
Factory reset button & watch dog design	Factory reset button to restore back to factory default settings. Watch dog design can reboot switch automatically under certain circumstances
Firmware Update	Support TFTP /FTP firmware upgradable
Configuration backup and restore	Supports text editable configuration file for system quick installation to backup and restore

*Future Release

**Optional

***Optional DDM SFP required

ORDERING INFORMATION

- **IGS-5400-2P-HV ……..P/N: 8388-100**
  4 Modular Slots L2 plus Industrial IEC-61850 Switch Chassis
  Built-in 1x isolated AC/DC 85~265VAC/100V~370VDC power conversion + 1x additional power slot; -20˚C to 60˚C
- **IGS-5400-2P-DC ……..P/N: 8388-118**
  4 Modular Slots L2 plus Industrial Switch IEC 61850-3 Chassis
  Built-in 1x DC 12~57VDC power supply + 1x additional power socket; -20˚C to 60˚C
- **IPGS-5400-2P-HV ……..P/N: 8388-130**
  4 Modular Slots L2 plus Industrial IEC 61853-3 PoE Switch Chassis
  Built-in 1x isolated AC/DC 75~265VAC/100V~370VDC power conversion + 1x additional power slot + 1x 48VDC PoE power input; -20˚C to 60˚C
- **IPGS-5400-2P-DC ……..P/N: 8388-138**
  4 Modular Slots L2 plus Industrial Switch Chassis
  Built-in 1x DC 12~57VDC power supply + 1x additional power socket + 1x 48VDC PoE power input; -20˚C to 60˚C
- **IGS-5400-2P-HV-E……..P/N: 8388-1001**
  4 Modular Slots L2 plus Industrial IEC-61850 Switch Chassis
  Built-in 1x isolated AC/DC 85~265VAC/100V~370VDC power conversion + 1x additional power slot; -40˚C to 75˚C
- **IGS-5400-2P-DC-E……..P/N: 8388-1181**
  4 Modular Slots L2 plus Industrial Switch IEC 61850-3 Chassis
  Built-in 1x DC 12~57VDC power supply + 1x additional power socket; -40˚C to 75˚C
- **IPGS-5400-2P-HV-E……..P/N: 8388-1301**
  4 Modular Slots L2 plus Industrial IEC 61853-3 PoE Switch Chassis
  Built-in 1x isolated AC/DC 75~265VAC/100V~370VDC power conversion + 1x additional power slot + 1x 48VDC PoE power input; -40˚C to 75˚C

- **IPGS-5400-2P-DC-E……...……..P/N: 8388-1381**
  4 Modular Slots L2 plus Industrial Switch Chassis
  Built-in 1x DC 12~57VDC power supply + 1x additional power socket + 1x 48VDC PoE power input; -40°C to 75°C

Modules for Slot 1-3 Note: the modules will be factory pre-installed.

- **8xGIGA T Module……..……..P/N: 8380-1055**
  8x 10/100/1000T Module; -40°C to 75°C
- **8xGIGA T-PoE at/af Module……..P/N: 8380-1145**
  8x 10/100/1000T PoE at/af Module; -40°C to 75°C
- **8x SFP Module……..……P/N: 8380-1065**
  8x Dual Speed SFP module for 100M SFP or Gigabit SFP; -40°C to 75°C
- **4x GIGA T + 4x SFP Module……..P/N: 8380-1075**
  4x 10/100/1000T + 4 x 100/1000M Dual Speed SFP Module ; -40°C to 75°C

Modules for Slot 4 Note: the modules will be factory pre-installed.

- **4x SFP Module……..……P/N: 8380-1155**
  4x Dual Speed SFP module for 100M SFP or Gigabit SFP; -40°C to 75°C

OPTIONAL ACCESSORIES

Power

EOTH000701

Isolated Power HV 85-265VAC, 100-370VDC 1.5A , 47-63HZ

DIN Rail Power

NDR-480 Series	480W Single Output Industrial Din Rail Power; 90-264VAC / 127-370VDC Input Range; Cooling by free air convection; RoHS2 ; Operating Temp. -20°C~70°C (ambient, derating each output at 2.5% per degree from 50°C ~ 70°C)
NDR-240 Series	240W Single Output Industrial Din Rail Power; 90-264VAC / 127-370VDC Input Range; Cooling by free air convection; RoHS2 ; Operating Temp. -20°C~70°C (ambient, derating each output at 2.5% per degree from 50°C ~ 70°C)
NDR-120 Series	120W Single Output Industrial Din Rail Power; 90-264VAC / 127-370VDC Input Range; Cooling by free air convection; RoHS2 ; Operating Temp. -20°C~70°C (ambient, derating each output at 2.5% per degree from 50°C ~ 70°C; For 115VAC, please refer to derating curve on NDR-120 Series datasheet)
NDR-75 Series	75W Single Output Industrial Din Rail Power; 90-264VAC / 127-370VDC Input Range; Cooling by free air convection; RoHS2 ; Operating Temp. -20°C~70°C (ambient, derating each output at 2.5% per degree from 50°C ~ 70°C; For 115VAC, please refer to derating curve on NDR-120 Series datasheet)

Mini GBIC (SFP)

8330-162X	MINI GBIC 1000SX (LC/0.5km) Transceiver	**8330-061**	100Base LX 30KM, Single-mode, LC Transceiver
8330-163X	MINI GBIC 1000SX2 (LC/2km) Transceiver	**8330-188**	LTSFP-1000BX-10KM Transceiver (WDM 1310)
8330-165X	MINI GBIC 1000LX (LC/10km) Transceiver	**8330-189**	LTSFP-1000BX-10KM Transceiver (WDM 1550)
8340-0591	MINI GBIC 1000LHX (LC/40km) Transceiver	**8330-186**	LTSFP-1000BX-20KM Transceiver (WDM 1310)
8330-166	MINI GBIC 1000XD (LC/50km) Transceiver	**8330-187**	LTSFP-1000BX-20KM Transceiver (WDM 1550)
8330-169	MINI GBIC 1000XD (LC/60km) Transceiver	**8330-180**	LTSFP-1000BX-40KM Transceiver (WDM 1310)
8330-167	MINI GBIC 1000ZX (LC/80km) Transceiver	**8330-182**	LTSFP-1000BX-40KM Transceiver (WDM 1550)
8330-170	MINI GBIC 1000EZX (120km) Transceiver	**8330-181**	LTSFP-1000BX-60KM Transceiver (WDM 1310)
8330-168D	MINI GBIC 10/100/1000T (100m) Transceiver	**8330-183**	LTSFP-1000BX-60KM Transceiver (WDM 1550)
8330-060	100Base FX 2KM, Multi-mode, LC Transceiver	**8330-184**	LTSFP-1000BX-80KM Transceiver (WDM 1490)
8330-065	100Base FX 5KM, Multi-mode, LC Transceiver	**8330-185**	LTSFP-1000BX-80KM Transceiver (WDM 1550)

DDM SFP are all above p/n# ended with “D”

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