

Cisco Network Convergence System 2000 Series

The Cisco® Network Convergence System (NCS) Family of products delivers an Evolved Programmable Network (EPN) that lets you simplify network operations, reduce network costs, and make your network more dynamic and profitable. The Cisco Network Convergence System 2000 Series (NCS 2000 Series) delivers agility, programmability, and massive scale across ultra-long-haul, metro, and enterprise optical networks.

Using the Cisco NCS 2000 Series, you can deploy a simple, yet intelligent dense wavelength-division multiplexing (DWDM) network that scales with operational ease. The Cisco NCS 2000 Series delivers agility with a touchless, flex-spectrum reconfigurable optical add/drop multiplexer (ROADM), and massive scale with 100- and 200-Gbps transponding and muxponding. Figure 1 shows three models of the Cisco NCS 2000 Series.

Figure 1. The Cisco NCS 2015, NCS 2006, and NCS 2002



nLight ROADM Innovation

Over a decade ago, the Cisco ONS 15454 MSTP brought ROADM technology mainstream, allowing service providers, governments, and enterprises to deploy a simple, yet intelligent DWDM network that could scale with operational ease. The Cisco NCS 2000 Series evolves the Cisco ROADM portfolio by introducing Cisco nLight™ ROADM technology. By supporting touchless re-configurability through colorless, omnidirectional, and contentionless add/drop, networks built using Cisco nLight ROADM technology can instantly respond to new bandwidth requests, route around network failures, and dynamically adjust their topology. And they can do it all without manual intervention. Highly meshed networks will benefit from support of up to 40 degrees of connectivity, while flex-spectrum capability optimizes spectrum utilization while protecting your investment in the photonic layer. Innovative single-module ROADMs integrate wavelength switching and amplification into a single-slot line card, simplifying node configurations and minimizing footprint.

100G and Beyond

Continuing Cisco's innovation in optical technology, nLight Silicon enables multirate DWDM line cards for the NCS 2000, which offer variable bit rates based on a software-configurable modulation scheme. The network operator can flexibly optimize the spectral efficiency and reach characteristics of each wavelength, improving network capacity and efficiency. State-of-the-art coherent digital-signal-processing (DSP) technology with soft-decision forward error correction (SD-FEC) enables 100-Gbps wavelengths to achieve unregenerated distances of up to 4500 km. Metro/regional networks can take advantage of 200-Gbps wavelengths, while ultra-long-haul networks can use 50-Gbps modulation to achieve transoceanic unregenerated distances.

Multilayer Network Intelligence

The Cisco NCS 2000 Series Wavelength Switched Optical Network (WSON) control-plane architecture enhances GMPLS capabilities with awareness of wavelength properties and optical impairments, offering dynamic service provisioning and restoration over a touchless DWDM network. Using a Cisco nLight Control Plane, the Cisco NCS 2000 Series intelligently interacts with packet layer devices, automating service provisioning, eliminating human error, and allowing advanced failure recovery.

Smooth Platform Integration and Interoperability

The Cisco NCS 2000 Series transparently integrates with the Cisco NCS 4000 at the network element, network management, and control plane levels, creating a unified packet optical transport system encompassing DWDM plus OTN and packet switching. The Cisco NCS 2000 Series also offers full support for Cisco ONS 15454 MSTP line cards, plus network level interoperability and unified management, helping ensure a smooth migration for customers with existing ONS 15454 MSTP networks.

Chassis Features and Options

The Cisco NCS 2000 Series offers three chassis variants to meet varying scale and space requirements. The Cisco NCS 2015 has 15 slots for service cards and is 14 rack units (14RU) high, allowing three chassis to fit into one standard rack (Figure 2). The Cisco NCS 2006 chassis is 6RU and has 6 slots for service cards (Figure 3). The NCS 2002 is 2RU and has 2 slots for service cards (Figure 4). Multishelf management allows multiple (up to 50) NCS 2015 and NCS 2006 shelves to be managed as a single network element, with a single target identifier (TID) and IP address, facilitating the construction of nodes with a very large number of ROADM degrees and/or service cards.

Cisco NCS 2000 Series chassis contain built-in memory to back up the software package, IP address, and circuit database. This built-in backup memory improves mean time to repair (MTTR) and increases operational simplicity. Also available on Cisco NCS 2000 Series chassis is the ability to connect passive devices via USB for performance and inventory management. Cisco NCS 2000 Series passive devices include memory containing device information, and photodiodes for measurement of power levels and connectivity verification. Table 1 compares the features.

Table 1. Feature Comparison

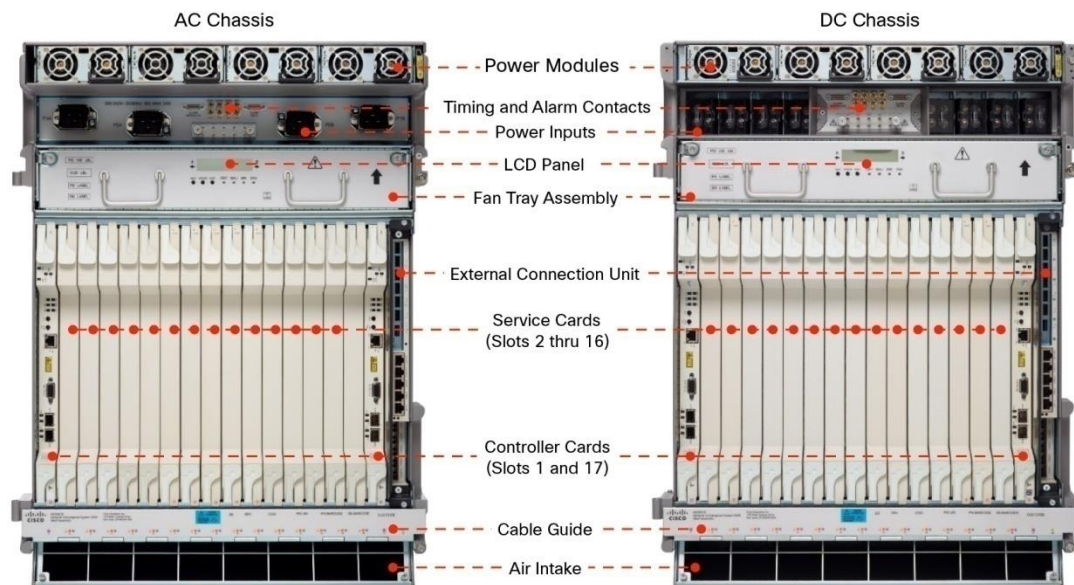
Feature	Cisco NCS 2015	Cisco NCS 2006	Cisco NCS 2002
Service slots	15	6	2
Controller-card slots	2	2	1
Power modules supported	4 (3 + 1 redundancy)	2 (1 + 1 redundancy)	1
Multishelf management	Yes, up to 10 shelves	Yes, up to 50 shelves	-

Cisco NCS 2015

The Cisco NCS 2015 chassis is ideal for high degree-count ROADM nodes or network hubs with large quantities of transponder or muxponder line cards. Two versions of the chassis support AC or DC power applications. Four slots accommodate up to four power modules (up to 3 + 1 redundant configuration for DC power and up to 2+2 redundant configuration for AC power), and are common to both the NCS 2000 and NCS 4000 Series. Power-cabling connectors are decoupled from the power modules themselves, allowing easy replacement of a module with no impact on cabling.

Airflow through the chassis is front-to-back, facilitating hot-aisle/cold-aisle installations. A replaceable fan tray containing eight fans divided among two separate circuits sits above the line cards, and also houses timing and alarm input and output connectors. Air is drawn in through a 2-inch input plenum at the bottom of the chassis, and expelled at the top-rear.

Figure 2. Cisco NCS 2015



The NCS 2015 External Connection Unit (ECU) is a replaceable module that provides interfaces for passive device inventory and management, multishelf management, and element management. Both RJ-45 and SFP interfaces are provided for multishelf and element management, allowing the convenience of copper as well as the distance flexibility of optical connections. Fourteen USB ports connect to passive devices, two of which are USB 3.0 ports capable of powering a USB hub to increase device fan-out and simplify cabling. NCS 2015 ECU interfaces are detailed in Table 2.

Figure 3. Cisco NCS 2015 External Connection Unit

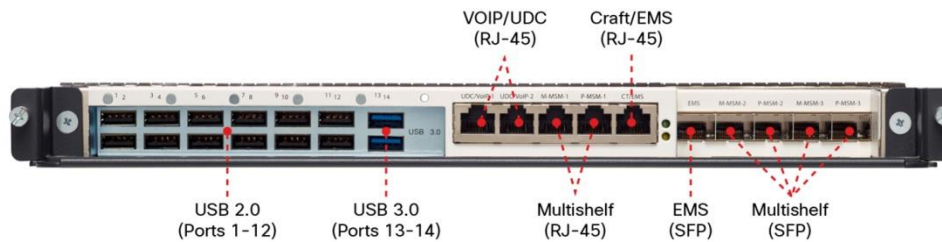


Table 2. NCS 2015 ECU Interfaces

Interface	Connector Type	Quantity
Passive inventory and management	USB 2.0	12
	USB 3.0	2
Multishelf management	RJ-45 (10BASE-T)	2
	SFP (100BASE-FX)	4
Element management system (EMS) or craft terminal	RJ-45 (10BASE-T)	1
	SFP (100BASE-FX)	1
User data channel (UDC)	RJ-45	2

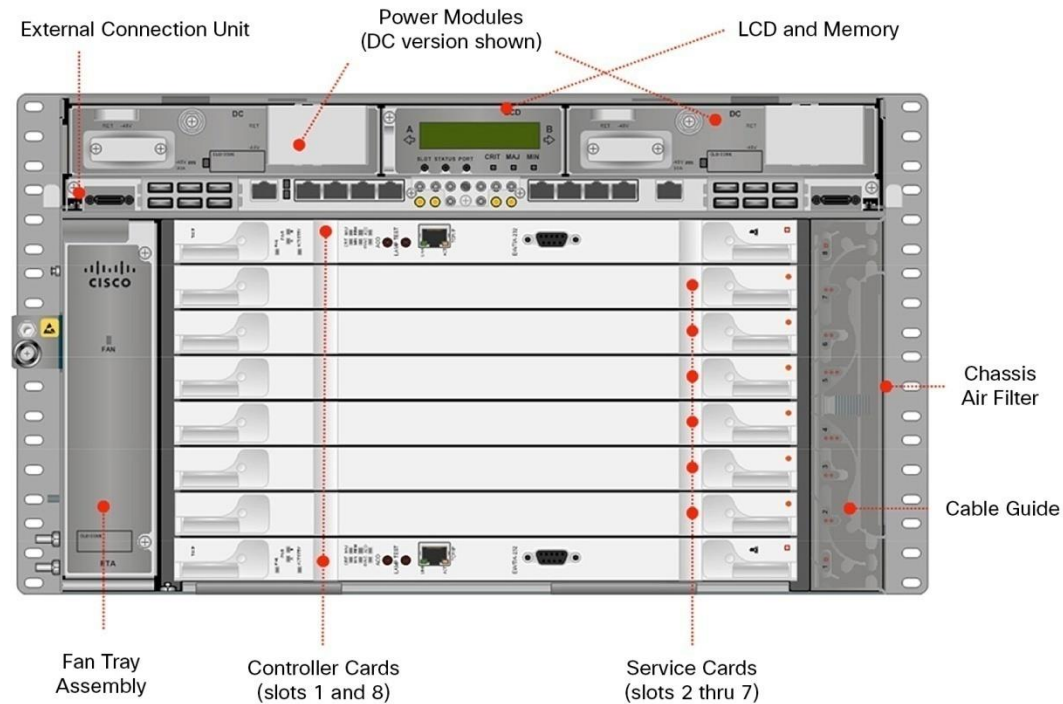
Cisco NCS 2006

At 6RU with 6 service slots, the Cisco NCS 2006 chassis is versatile. Metro/edge locations can minimize footprint while still accommodating multiple ROADMs degrees and/or service line cards, and large core nodes can scale as large as necessary by using multishelf configurations.

You can configure the Cisco NCS 2006 chassis with DC or AC power inputs. The DC power module has connectors for both ANSI- and ETSI-style battery connections, making it universal. The AC power modules have a single input and are universal in that they accept a power input ranging from 110 to 240 VAC, 50 to 60 Hz.

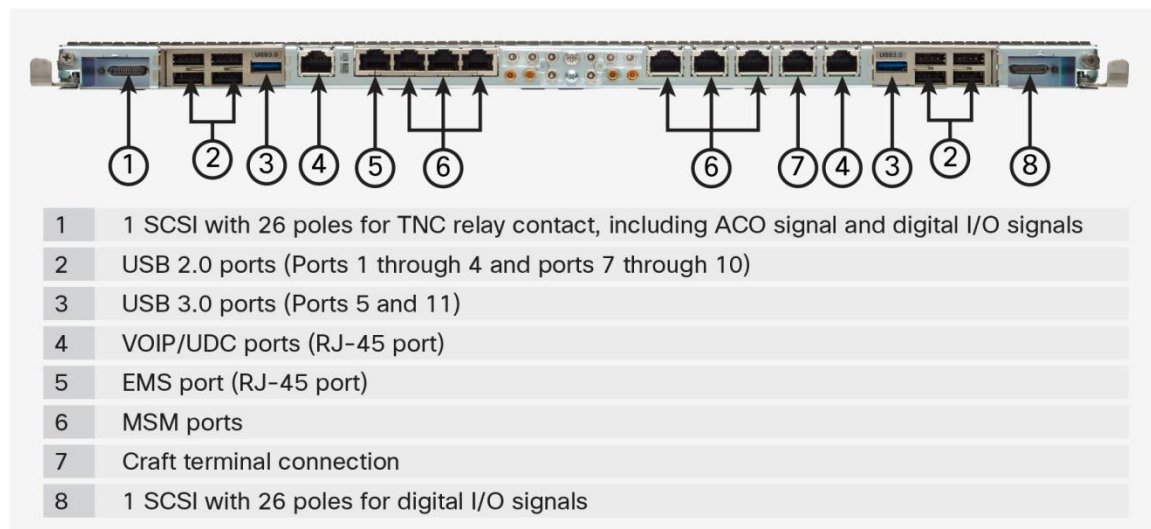
The Cisco NCS 2006 can be mounted into 19-, 21-, or 23-inch racks or cabinets. Brackets come with the shelf assembly and can also be ordered as spares. You can use optional air deflectors in 21- and 23-inch installations. Airflow is side-to-side, but you can add deflectors for front-to-back and front-to-front airflow. In the 21-inch configuration airflow could also be front-to-top. Additionally, an air plenum is available that you can be used for front to back airflow in 19-inch rack configurations. Chassis details are shown in Figure 4.

Figure 4. Cisco NCS 2006



The Cisco NCS 2006 ECU (Figure 4) is a replaceable module that provides interfaces for multishelf management, element management, passive device management, external alarm inputs and outputs, and timing. RJ-45 ports provide multishelf and element-management connectivity, and 12 USB ports connect to passive devices for inventory and management. It is available also a second model of External Connection Unit (ECU-S) that support 8 USB 2.0 ports and 2 USB 3.0 Ports. The interfaces available on the NCS 2006 ECU-S are detailed in Table 3.

Figure 5. Cisco NCS 2006 External Connection Unit with 2x USB 3.0 Ports



A second variant of NCS2006 External Connection Unit is available to cope with -60V DC power requirement. The unit is substantially identical to the ECU-S support the same functionality in terms of USB ports, timing and management ports. This card is designed for NCS2006 chassis supporting DC supplies only. The Input voltage range for the -60VDC nominal would be -50V to -72VDC. The design is based on existing ECU-S, with the exceptions being listed below:

- The PoE functionality will be removed from VOIP/UDC RJ45 ports. The UDC functionality is still available to support also VOIP channels but without Power Over Ethernet capability
- External alarms removed. The alarm connectors are completely removed from the front panel and replaced with a new face plate
- No connections to the shelf controller relay contact are available
- No remote Alarm Cut Off (ACO) signal
- No Digital Input/Output (D-I/O) signals

Table 3. NCS 2006 ECU and ECU-S Interfaces

Interface	Connector Type	Quantity - ECU	Quantity - ECU-S
Passive inventory and management	USB 3.0	N/A	2
Passive inventory and management	USB 2.0	12	8
BITS-Out	SMB (ETSI), 4 wire-wrap pins (ANSI)	2	2
BITS-In	SMB (ETSI), 4 wire-wrap pins (ANSI)	2	2
Multishelf management	RJ-45	6	6
EMS and craft terminal	RJ-45	2	2
Time-of-day (ToD), 10 MHz in and out, packets per second (pps) in and out	RJ-45	1	1
User data channel (UDC)	RJ-45	1	1
TNC relay contact (26 poles, left-side connector)	SCSI	1	1
Digital I/O signals (26 poles, right-side connector)	SCSI	1	1

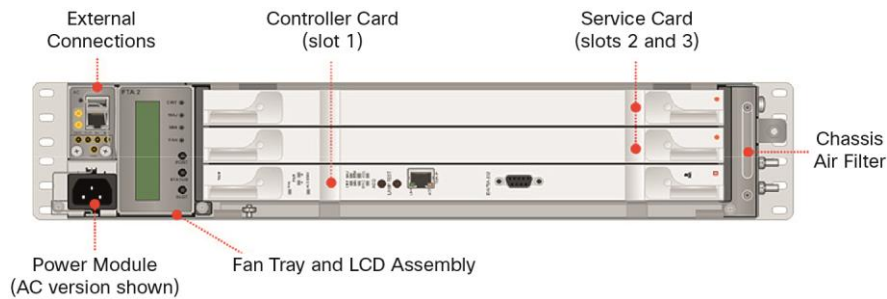
Cisco NCS 2002

The Cisco NCS 2002 is ideally suited to line amplifier configurations, a 2-degree ROADM node, or anywhere that only 2 slots are required for transponding or muxponding services (Figure 6). It features 1 slot for the control card and 2 slots for service cards. You can configure the NCS 2002 with a single DC or AC power module. The DC power module has inputs for redundant A and B feeds. The integrated AC power module has a single input and is universal in that it accepts a power input ranging from 110 to 240 VAC, 50 to 60 Hz.

Although a single processor card controls the node, the NCS 2002 contains a built-in memory module to back up the software package, IP address, and circuit database. This backup capability improves MTTR and increases operational simplicity. Integrated RJ-45 and USB ports provide management connectivity and passive device connectivity, respectively. Timing inputs and outputs are also present.

You can mount the NCS 2002 in 19-, 21-, or 23-inch racks or cabinets. Brackets come with the shelf assembly and can also be ordered as spares. You can use optional air deflectors in 21- and 23-inch installations. With 19-inch brackets, the airflow is right-to-left; with 21-inch brackets, airflow can be selected as right-to-left; right-front-in, and left-front-out; left-up-out; or left-back-out. With 23-inch brackets, airflow is from right-front-in to left-back-out.

Figure 6. Cisco NCS 2002



Transport Node Controller

The Cisco NCS 2000 Series uses the TNC line card to provide timing, communication, multishelf management, alarming, and passive device management. The TNC also provides optical-service-channel (OSC) termination through two SFP ports, with support for Fast Ethernet and Gigabit Ethernet connections, in addition to OC-3/STM-1 for backward compatibility. Optionally, a transport shelf controller (TSC) is available for the NCS 2006 and NCS 2002. The function of the TSC is identical to that of the TNC, but omits OSC termination. Controller-card chassis and software compatibility are outlined in Table 4.

Table 4. Cisco NCS 2000 Controller Compatibility

Controller Card	Chassis Compatibility	Minimum Software
NCS2K-TNCS-O-K9	NCS 2015 and NCS 2006	10.5.2
NCS2K-TNCS-K9	NCS 2015, NCS 2006, and NCS 2002	10.5
15454-M-TNCE-K9	NCS 2002 and NCS 2006	9.3
15454-M-TSCE-K9	NCS 2002 and NCS 2006	9.3

Management

The Cisco NCS 2000 Series is managed by the Cisco Transport Controller on-demand application, which offers features including:

- Multilayer graphical network, node, and card visibility
- A-to-Z network-based service provisioning
- Graphical software wizards to simplify and speed user operations for such tasks as:
 - Initial network turn-up
 - Service provisioning
 - Network, node, and bandwidth upgrades

In addition to the integrated software features, the Cisco NCS 2000 Series is supported by an easy-to-use but powerful network design tool, Cisco Transport Planner. This user-friendly tool is fully developed and tested by Cisco for modeling and optimizing DWDM networks based on your network parameters.

Product Specifications

Tables 5 through 7 list specifications of the Cisco NCS 2015, NCS 2006, and NCS 2002, respectively.

Table 5. Cisco NCS 2015 Product Specifications

Item	Specification
Power Requirements	Maximum
DC power configuration	5250W (1750W per power module, 3+1 redundancy configuration)
AC power configuration	6000W (3000W per power module, 2+2 redundancy configuration)
Power Consumption	
Fan-tray assemblies	560W
Physical Dimensions	
Rack-mounting	19- or 23-in. (483- or 584-mm) EIA rack-mounting
Cisco NCS 2015 DC shelf assembly	(H x W x D): 24.4 x 17.5 x 11.1 in. (619.76 x 444.5 x 281.94 mm) Door width: 19 in. (482.6 mm)
Cisco NCS 2015 AC shelf assembly	(H x W x D): 24.4 x 17.5 x 15.5 in. (619.76 x 444.5 x 393.7 mm) Door width: 19 in. (482.6 mm)
Environmental Conditions	
Storage temperature	-40 to 158°F (-40 to 70°C)
Operating temperature • Normal • Short-term¹	32 to 131°F (0 to 55°C) 23 to 131°F (-5 to 55°C)
Relative humidity • Normal • Short-term²	5 to 85%, noncondensing 5 to 90% but not to exceed 0.024 kg water/kg of dry air

Table 6. Cisco NCS 2006 Product Specifications

Item	Specification
Power Requirements	Maximum
AC power configuration	1600W
DC power configuration	
NCS2006-DC40 power module	1920W
NCS2006-DC power module (30 amp)	1400W
NCS2006-DC20 power module	960W
Power Consumption	
Fan-tray assemblies	120W
AC power module	15% of the sum of the maximum consumption of all populated cards
DC power modules	40W
Physical Dimensions	
Rack-mounting	19- or 23-in. (483- or 584-mm) EIA rack-mounting 19-in. (483-mm) rack-mounting or 21-in. (533-mm) cabinet-mounting
Cisco NCS 2006 shelf assembly	(H x W x D): 10.45 x 17.45 x 11.02 in. (265.4 x 443.3 x 280 mm)
Environmental Conditions	
Storage temperature	-40 to 158°F (-40 to 70°C)
Operating temperature • Normal • Short-term¹	32 to 131°F (0 to 55°C) 23 to 131°F (-5 to 55°C)

Item	Specification
Relative humidity	
• Normal	5 to 85%, noncondensing
• Short-term ²	5 to 90% but not to exceed 0.024 kg water/kg of dry air

¹ Refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year.

² Refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.

Table 7. Cisco NCS 2002 Product Specifications

Item	Specification
Power Requirements	Maximum
AC power configuration	350W
DC power configuration	450W
Power Consumption	
Fan-tray assemblies	40W
AC power module	52W
DC power modules	30W
Physical Dimensions	
Rack-mounting	19- or 23-in. (483- or 584-mm, respectively) EIA rack-mounting 19-in. (83-mm) rack-mounting or 21-in. (533-mm) cabinet-mounting
Shelf Assembly	
Cisco NCS 2002 shelf assembly	(H x W x D): 3.46 x 17.18 x 11.02 in. (87.9 x 436.4 x 280 mm)
Environmental Conditions	
Storage temperature	-40 to 158°F (-40 to 70°C)
Operating temperature	Normal: 32 to 131°F (0 to 55°C) Short-term ¹ : 23 to 131°F (-5 to 55°C)
Relative humidity	Normal: 5 to 85%, noncondensing Short-term ² : 5 to 90% but not to exceed 0.024 kg water/kg of dry air

Regulatory Standards Compliance

Table 8 summarizes regulatory standard compliance and agency approvals.

Table 8. Regulatory Standard Compliance and Agency Approvals

ANSI (Cisco NCS 2002) System	ETSI (Cisco NCS 2002) System
Supported Countries	
• Canada • United States • Korea	• Europe • Latin America • Japan • Asia Pacific • Middle East and Africa
EMC (Class A)	
• ICES-003 Issue 4 (2004) • GR-1089-CORE, Issue 4 (Type 2 and Type 4 equipment) • GR-1089-CORE - Issue 03 (Oct 2002) (Objective O3-2 - Section 3.2.1 - Radiated Emissions requirements with all doors open) • FCC 47CFR15, Class A subpart B (2006)	• EN 300 386 v1.3.3 (2005) and v1.4.1 (2007) • CISPR 22 - Fifth edition (2005-04) Class A and the amendment 1 (2005-07) • CISPR 24 - First edition (1997-09) and amendment 1 (2001-07) and amendment 2 (2002-10) • EN 55022:1998 Class A - CENELEC Amendment A2:2003 • EN 55024:1998 - CENELEC Amendment A1:2001 and Amendment A2:2003 • Resolution 237 (Brazil) • VCCI V-3/2006.04 • EN 61000-6-1:2001 • EN 61000-6-2:1999

ANSI (Cisco NCS 2002) System	ETSI (Cisco NCS 2002) System
Safety	
• UL/CSA 60950-1 2nd Ed. 2011 • GR-1089-CORE, Issue 6 (Type 2 and Type 4 equipment)	• UL/CSA 60950-1 2nd Ed. 2011 • IEC 60950-1 2nd Ed. + Amendment 1:2009, EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 (with all country deviations)
Environmental	
• GR-63-CORE, Issue 3 (2006)	• ETS 300-019-2-1 V2.1.2 (Storage, Class 1.1) • ETS 300-019-2-2 V2.1.2 (Transportation, Class 2.3) • ETS 300-019-2-3 V2.1.2 (Operational, Class 3.1E) • EU WEEE regulation • EU RoHS regulation
Power and Grounding	
• GR-1089-CORE, Issue 4	• ETS 300 132-2
Optical Safety	
• EN or IEC-60825-2 Third edition (2004-06) • EN or IEC 60825-1 Consol. Ed. 1.2 - incl. am1+am2 (2001-08) • 21CFR1040 (2004/04) (Accession Letter and CDRH Report) • IEC-60825-2 Third edition (2004-06) • ITU-T G.664 (2006)	
Miscellaneous	
• Acoustic noise ◦ GR-63-CORE, Issue 3 (2006) ◦ ETS 300 753 ed.1 (1997-10) • Mechanical shock and bumps ◦ AS1099- 2.27 • Customer-specific requirements ◦ AT&T Network Equipment Development Standards (NEDS) Generic Requirements, AT&T 802-900-260 ◦ SBC TP76200MP ◦ Verizon SIT.NEBS.NPI.2002.010	

Ordering Information

To place an order, visit the Cisco Ordering homepage and refer to Tables 9 through 13. To download software, visit the Cisco Software Center: <http://www.cisco.com/cisco/software/type.html?mdfid=278281788&i=rm>.

Table 9. Cisco NCS 2015 Common Equipment

Product ID	Description
NCS2015-SA-DC=	NCS 2015 Shelf Assembly - DC Power
NCS2015-SA-AC=	NCS 2015 Shelf Assembly - AC Power
NCS2015-FTA=	NCS 2015 Fan Tray
NCS2015-ECU=	NCS 2015 External Connections Unit
NCS2015-DOOR=	NCS 2015 Door and Fiber Tray
NCS2015-DDR=	NCS 2015 Deep Door and Fiber Tray
NCS2015-AC-DDR=	NCS 2015 AC Shelf Deep Door and Fiber Tray
NCS2015-BRK-KIT=	NCS 2015 Spare Bracket Kit
NCS2015-FTF=	NCS 2015 Fan tray Air Filter
NCS2015-SYS-DC	NCS 2015 DC power System Assembly to Order
NCS2015-SYS-AC	NCS 2015 AC power System Assembly to Order
NCS4K-DC-PSU-V1=	NCS 4000 DC Power System Unit - 1750 W - Balanced A and B
NCS4K-AC-PSU=	NCS 4000 AC Power System Unit - 3000 W

Table 10. Cisco NCS 2006 Common Equipment

Product ID	Description
NCS2006-SA=	Shelf assembly with brackets, Cisco NCS 2006
NCS2006-DR=	Chassis Door, Cisco NCS 2006
NCS2006-DDR=	Chassis Deep Door, Cisco NCS 2006
NCS2006-FTA=	Fran Tray assembly, Cisco NCS 2006
15454-M6-FTF=	6-service-slot MSTP chassis fan tray filter
NCS2006-DC=	30A DC Power Supply Module, Cisco NCS2006
NCS2006-DC20=	20A DC Power Supply Module, Cisco NCS2006
NCS2006-DC40=	NCS 2006 40A DC Power Filter
NCS2006-AC=	AC Power Supply Module, Cisco NCS2006
NCS2006-PWRFLR=	Power Module blank filler, Cisco NCS 2006
NCS2006-ECU=	External Connection Unit, Cisco NCS 2006
NCS2006-ECU60-S=	NCS 2006 External Connections Unit -w/ 2x USB 3.0 Ports -60V
NCS2006-LCD=	LCD and Memory, Cisco NCS 2006
15454-M6-BRKT=	19-in./23-in. and 21-in. Brackets, Cisco NCS 2006
15454-M6-DEF21=	21-in. Air deflector, Cisco NCS 2006
15454-M6-DEF23=	23-in. Air deflector, Cisco NCS 2006
NCS2006-CAB-DEFL=	NCS2006/M6 Front-to-Back air defl, 19, 21, 23 cabinets, 23 rack
NCS2006-ECU-S=	NCS 2006 External Connections Unit - w/ 2x USB 3.0 Ports
15454-M-SHIPKIT=	Shipkit, Cisco NCS 2006 and Cisco NCS2002

Table 11. Cisco NCS 2002 Common Equipment

Product ID	Description
NCS2002-SA=	Shelf assembly, Cisco NCS2002
NCS2002-DR=	Chassis Door, Cisco NCS2002
NCS2002-DDR=	Chassis Deep Door, Cisco NCS2002
NCS2002-FTA=	Fran Tray assembly, Cisco NCS2002
15454-M2-FTF=	2-service-slot MSTP chassis fan tray filter
NCS2002-DC=	DC Power Supply Module, Cisco NCS2002
NCS2002-DC-E=	DC ETSI Power Supply Module, Cisco NCS2002
NCS2002-AC=	AC Power Supply Module, Cisco NCS2002
15454-M2-BRKT=	19"/23" and 21" Brackets, Cisco NCS2002
15454-M2-DEF21=	21" Air deflector, Cisco NCS2002
15454-M2-DEF23=	23" Air deflector, Cisco NCS2002
15454-M2-WM=	Wall mount bracket, Cisco NCS2002
15454-M-SHIPKIT=	Shipkit, Cisco NCS2006 and Cisco NCS2002

Table 12. Cisco NCS 2000 Series Line Cards and Components

Product ID	Description
Controller	
NCS2K-TNCS-K9=	Transport Node Controller for NCS2002, 2006 & 2015 chassis
15454-M-TNCE-K9=	MSTP/NCS 2K Transport Node Controller
15454-M-TSCE-K9=	MSTP/NCS 2K Transport Shelf Controller

Product ID	Description
NCS2K-TNCS-O-K9=	NCS 2000 Transport Node Controller w/ 2x OTDR/OSC
ROADM	
NCS2K-9-SMR17FS=	9-port Single Module ROADM - 0-17dB Gain - Flex Spectrum
NCS2K-9-SMR24FS=	9-port Single Module ROADM - 12-24dB Gain - Flex Spectrum
NCS2K-9-SMR34FS=	9-port Single Module ROADM - 20-34dB Gain - Flex Spectrum
NCS2K-20-SMRFS=	20-port Single Module ROADM - Switchable Gain Flex Spectrum
NCS2K-20-SMRFS-CV=	20-port SMR - Switch. Gain Flex Spectrum - Conn. Verif.
NCS2K-9-SMR17FS-L=	9-port Single Module ROADM - 0-17dB Gain - FS - Licensed
NCS2K-9-SMR24FS-L=	9-port Single Module ROADM - 12-24dB Gain - FS - Licensed
NCS2K-9-SMR34FS-L=	9-port Single Module ROADM - 20-34dB Gain - FS - Licensed
NCS2K-20-SMRFS-L=	20-port Single Module ROADM - Switchable Gain FS - Licensed
L-NCS2K-SMR-FS=	NCS 2K/MSTP Lic SMR - Flex Spectrum Activation e-Delivery
L-NCS2K-SMR-2P=	NCS 2K/MSTP Lic SMR - 2-port Activation e-Delivery
L-NCS2K-SMR-4P=	NCS 2K/MSTP Lic SMR - 4-port Activation e-Delivery
NCS2K-16-WXC-FS=	16-ports Wavelength X-Connect and Mux/Demux - Flex Spectrum
15454-40-SMR1-C=	40Chs Single Module ROADM with integrated Optical PRE Amplif, includes one 2m LC/LC fiber-optic cable and one LC/LC LOOPBACK
15454-40-SMR2-C=	40Chs Single Module ROADM with integrated Optical PRE, Boos, includes one LC/LC LOOPBACK
Passives	
NCS2K-MF-MPO-16LC=	MPO-16 to 16xLC Fan-Out MF Unit - With Integrated Monitoring
NCS2K-MF-2MPO-ADP=	Double MPO-16 to 2xMPO-8 Adapter MF Unit - Monitoring
NCS2K-PPMESH8-5AD=	2RU 8-Degree Mesh Patch Panel- 5-Add/Drop Port + Monitoring
NCS2K-MF-16AE-CFS=	16-Port Add/Drop + Express MF Unit - Colorless Flex Spectrum
NCS2K-MF-10AD-CFS=	10-Port Add/Drop MF Unit - Colorless Flex Spectrum
NCS2K-MF-6AD-CFS=	6-Port Add/Drop MF Unit - Colorless Flex Spectrum
NCS2K-MF-2LC-ADP=	Double LC-LC Adapter MF Unit
NCS2K-HP-LC-2=	E2000 High-Power to LC patch-cord 2m
NCS2K-MF-1RU=	Mechanical Frame - 4 slots - 1 RU
NCS2K-MF-6RU=	Mechanical Frame for Passive Units - 14slots w/ USB Hub - 6RU
NCS2K-MF10-6RU=	Mechanical Frame for Passive Units - 10slots w/ USB Hub - 6RU
NCS2K-MF-6RU-CVR=	Cover for the 6RU Mechanical Frame for Passive Units
NCS2K-MF-DEG-5=	Mesh Interconnection MF Unit - Up to 5 Degrees
NCS2K-MF-DEG-5-CV=	5 Degrees Mesh Interconnect - w/ Connection Verification
NCS2K-MF-UPG-4=	Mesh Interconnection MF Unit - Upgrade - 4 Degrees
NCS2K-MF-UPG-4-CV=	4-Deg Upgrade Mesh Interconnect - w/ Connection Verification
NCS2K-MF-16AD-CFS=	16-Ports Add/Drop MF Unit - Colorless and FlexSpectrum
NCS2K-MF-4X4-COFS=	4-Degree and 4-Ports Add/Drop MF Unit - CO and FlexSpectrum
NCS2K-MF-MPO-8LC=	MPO to 8x LC Fan-Out MF Unit - With Integrated Monitoring
NCS2K-MF-M16LC-CV=	MPO-16 to 16xLC Fan-Out - w/ Connection Verification
NCS2K-MF-MPO-20LC=	MPO to 8x LC Fan-Out MF Unit - With Integrated Monitoring
NCS2K-MF-2SL-CVR=	Cover for the Mechanical Frame w/ USB cable holder - 2slot
NCS2K-MF-COVER=	1RU cover for mechanical frame
NCS2K-2RU-COVER=	2RU Cover for the EF-40, MD-48 and PPMESH8 Units
NCS2K-MPO-LBK=	8-fiber MPO Loopback - Male connector

Product ID	Description
NCS2K-LC-LBK=	LC Loopback - Male connectors
NCS2K-MPO16-LBK=	16-fiber MPO Loopback - Male connector
NCS2K-MF-8X10G-FO=	2x4x10G QSFP+ to 10G Fan Out
Optical Amplifiers	
15454-OPT-EDFA-17=	Enhanced C-band 96 channel low cost amplifier 17 dB max gain, 50 GHz compatible, LC connector, includes two 2m LC/LC fiber-optic cables
15454-OPT-EDFA-24=	Enhanced C-band 96 channel low cost amplifier 24 dB max gain, 50 GHz compatible, LC connector, includes two 2m LC/LC fiber-optic cables
NCS2K-EDRA1-26C=	21dBm Erbium Doped Raman Amplifier 26dB Span - C-Band, includes one 2m LC/LC fiber-optic cables and one 2m E2000/PC High power fiber optical cable
NCS2K-EDRA1-35C=	21dBm Erbium Doped Raman Amplifier 35dB Span - C-Band, includes one 2m LC/LC fiber-optic cable and one 2m E2000/PC High power fiber optical cable
NCS2K-EDRA2-26C=	21dBm Erbium Doped Raman Amplifier + Bst 26dB Span - C-Band, includes two 2m LC/LC fiber-optic cables and one 2m E2000/PC High power fiber optical cable
NCS2K-EDRA2-35C=	21dBm Erbium Doped Raman Amplifier + Bst 35dB Span - C-Band, includes two 2m LC/LC fiber-optic cables and one 2m E2000/PC High power fiber optical cable
15454-OPT-AMP-C=	ONS 15454 Enhanced Optical Amplifier, includes two 2m LC/LC fiber-optic cable and one LC/LC LOOPBACK
15454-OPT-AMP-17C=	17dB Gain, Amp, includes two 2m LC/LC fiber-optic cable and one LC/LC LOOPBACK
15454-M-RAMAN-CTP=	15454 MSTP - Raman Amplifier - C-band - Counter-Propagating, includes two 2m E2000/PC High power fiber optical cable
15454-M-RAMAN-COP=	15454 MSTP - Raman Amplifier - C-band - Co-Propagating, includes one 2m E2000/PC High power fiber optical cable
15454-PSM=	Includes two 2m LC/LC fiber-optic cable and one LC/LC LOOPBACK
Transponder/Muxponder	
NCS2K-MR-MXP-LIC=	10/40/100G MR Muxponder - Licensable for Encryption
L-NCS2K-MRE10-40G=	SW license to enable Encryption on 10G and 40G client ports
L-NCS2K-MRE-100G=	SW license to enable Encryption on 100G client ports
NCS2K-200G-CK-C=	50G/100G/200G CPAK Multi Rate Line Card - SD FEC C Band
L-NCS2K-CK-CL=	SW license - CPAK Client
L-NCS2K-FS=	SW license - Flex-Spectrum on WDM Trunk port
L-NCS2K-DQPSK-LH=	SW license - HG-FEC on 100G CP-DQPSK WDM Trunk port
L-NCS2K-SD-FEC=	SW license - Soft-Decision FEC on WDM Trunk port
L-NCS2K-SFEC-BPSK=	SW license - SD-FEC & BPSK on 50G WDM Trunk port
L-NCS2K-SFEC-16Q=	SW license - SD-FEC & 16-QAM on 200G/250G WDM Trunk port
NCS2K-100G-CK-C=	100G CPAK Multi-Rate Line Card - CP-DQPSK - C-Band
NCS2K-100ME-CKC=	100G CPAK Multi-Rate Line Card - CP-DQPSK - Metro - C-Band
L-NCS2K-100G-FFU=	NCS 2K/MSTP License 100G LC - Full Feature Upg e-Delivery
L-NCS2K-100G-10G=	NCS 2K/MSTP License 100G MXP - 1x 10G MR Port e-Delivery
NCS2K-400G-XP=	400G CFP2 MR xponder
NCS2K-400GXP-L-K9=	400G CFP2 MR XP licensed 100G client bandwidth + 1 port WDM
L-NCS2K-100G-LIC=	100G bandwidth client license
L-NCS2K-WDM-LIC=	WDM port license
L-NCS2K-8QAM=	WDM port license - upgrade to 8QAM (150G)
L-NCS2K-16QAM=	WDM port license - upgrade to 16QAM (200G)

Product ID	Description
Blanks	
15454-BLANK=	Shelf slot-filler panel, fits any slot in NCS 2000 shelf assembly
15454E-BLANK=	15454 ETSI Blank Module (Slot Filler)
15454-M-FILLER=	Shelf line-slot filler card, fits line-card slots in Cisco ONS 15454 M6 and NCS2002 chassis
15454-M-T-FILLER=	Shelf control-slot filler card, fits control-card slots in Cisco ONS 15454 M6 and NCS2002 chassis

Table 13. Cisco NCS 2000 Series Cables

Product Number	Description	Length	Gauge	Connector 1	Connector 2
15454-M-120TMGCBL=	BITS IN/OUT cable for ANSI	0.6 m	COAX 23 AWG	DIN 1.0/2.3	2 WIRE WRAP PINS
15454-M2-DCCBL-LE=	DC power cable for ETSI left exit	10 m	12 AWG	Power D-Sub 2 poles	None
NCS2006-DCCBL-LE=	DC power cable for ETSI left exit	10 m	6 AWG	Power D-Sub 3 poles	None
NCS2006-DCCBL-RE=	DC power cable for ETSI right exit	10 m	6 AWG	Power D-Sub 3 poles	None
15454-M6-DCCBL2-L=	DC power cable for DC40 ETSI Left exit	10 m	6 AWG	Pwr TwinBlade	None
15454-M6-DCCBL2-R=	DC power cable for DC40 ETSI right exit	10 m	6 AWG	Pwr TwinBlade	None
15454-M-ACCBL2-L=	AC2 power cable ANSI 110Vac left exit	3 m	20A - 125V	C19	NEMA 5-20P
15454-M-ACCBL2-L2=	AC2 power cable ANSI 220Vac left exit	3 m	20A - 250V	C19	NEMA 6-20P
15454-M-ACCBL2-R=	AC2 power cable ANSI 110Vac right exit	3 m	20A - 125V	C19	NEMA 5-20P
15454-M-ACCBL2-R2=	AC2 power cable ANSI 220Vac right exit	3 m	20A - 250V	C19	NEMA 6-20P
15454-M-ALMCBL=	SCSI Alarm cable	20 m	28 AWG	Mini SCSI	None
15454-M-ALMCBL2=	SCSI Alarm cable limited to 8 inputs	20 m	24 AWG	Mini SCSI	None
15454-M-CBL2-LARG=	AC2 power cable - ARG left exit	3 m	16A - 250V	C19	IRAM 2073 - IEC 60884-1
15454-M-CBL2-LAUS=	AC2 power cable - AUS left exit	3 m	16A - 250V	C19	AS/NZS 3112: 2000
15454-M-CBL2L-CHI=	AC2 power cable - China left exit	3 m	16A - 250V	C19	GB2099.1/GB1002
15454-M-CBL2-L-EU=	AC2 power cable - EU left exit	3 m	16A - 250V	C19	CEE 7 STANDARD SHEET VII
15454-M-CBL2L-IND=	AC2 power cable - India left exit	3 m	16A - 250V	C19	IS 1293
15454-M-CBL2L-JPN=	AC2 power cable - Japan left exit	3 m	20A - 125V	C19	JIS C8303 & JIS C8306
15454-M-CBL2-LKOR=	AC2 power cable - KOR left exit	3 m	16A - 250V	C19	K60884-01
15454-M-CBL2-L-UK=	AC2 power cable - UK left exit	3 m	13A - 250V	C19	BS 1363/A & SS145/A
15454-M-CBL2-RARG=	AC2 power cable - ARG right exit	3 m	16A - 250V	C19	IRAM 2073 - IEC 60884-1
15454-M-CBL2-RAUS=	AC2 power cable - AUS right exit	3 m	16A - 250V	C19	AS/NZS 3112: 2000
15454-M-CBL2R-CHI=	AC2 power cable - China right exit	3 m	16A - 250V	C19	GB2099.1/GB1002
15454-M-CBL2-R-EU=	AC2 power cable - EU right exit	3 m	16A - 250V	C19	CEE 7 STANDARD SHEET VII
15454-M-CBL2R-IND=	AC2 power cable - India right exit	3 m	16A - 250V	C19	IS 1293
15454-M-CBL2R-JPN=	AC2 power cable - Japan right exit	3 m	20A - 125V	C19	JIS C8303 & JIS C8306

Product Number	Description	Length	Gauge	Connector 1	Connector 2
15454-M-CBL2-RKOR=	AC2 power cable - KOR right exit	3 m	16A - 250V	C19	K60884-01
15454-M-CBL2-R-UK=	AC2 power cable - UK right exit	3 m	13A - 250V	C19	BS 1363/A & SS145/A
15454-M-TMGCBL=	BITS IN/OUT cable for ETSI	20 m	COAX 23 AWG	DIN 1.0/2.3	none
15454-M-USBCBL=	USB cable for passive devices	3 m	28#/1P + 24#/2C + AEB	USB "A" MALE	USB "A" MALE

Table 14. Cisco NCS 2000 Series Optical Cables

Product Number	Description	Comment
15216-ATT-LC-10=	Bulk Attenuator - LC Connector - 10dB	
15216-ATT-LC-12=	Bulk Attenuator - LC Connector - 12dB	
15216-ATT-LC-15=	Bulk Attenuator - LC Connector - 15dB	
15216-ATT-LC-18=	Bulk Attenuator - LC Connector - 18dB	
15216-ATT-LC-2=	Bulk Attenuator - LC Connector - 2dB	
15216-ATT-LC-3=	Bulk Attenuator - LC Connector - 3dB	
15216-ATT-LC-5=	Bulk Attenuator - LC Connector - 5dB	
15216-ATT-LC-7=	Bulk Attenuator - LC Connector - 7dB	
15216-LC-LC-10	Fiber patchcord - LC to LC - 6m	
15216-LC-LC-10=	Fiber patchcord - LC to LC - 6m	
15216-LC-LC-20	Fiber patchcord - LC to LC - 8m	
15216-LC-LC-20=	Fiber patchcord - LC to LC - 8m	
15216-LC-LC-5	Fiber patchcord - LC to LC - 4m	
15216-LC-LC-5=	Fiber patchcord - LC to LC - 4m	
15216-LC-LC-MM-2	Fiber patchcord - LC to LC - Multi Mode - 2m	
15216-LC-LC-MM-2=	Fiber patchcord - LC to LC - Multi Mode - 2m	
15216-LC-LC-MM-5	Fiber patchcord - LC to LC - Multi Mode - 5m	
15216-LC-LC-MM-5=	Fiber patchcord - LC to LC - Multi Mode - 5m	
15216-LC-SC-10=	Fiber patchcord - LC to SC - 6m	
15216-LC-SC-20=	Fiber patchcord - LC to SC - 8m	
15216-LC-SC-5=	Fiber patchcord - LC to SC - 4m	
15454-24MPO-MPO-2=	24-Fiber patchcord - MPO to MPO - 2m	
15454-24MPO-MPO-4=	24-Fiber patchcord - MPO to MPO - 4m	
15454-24MPO-MPO-6=	24-Fiber patchcord - MPO to MPO - 6m	
15454-24MPO-MPO-8=	24-Fiber patchcord - MPO to MPO - 8m	
15454-LC-LC-2=	Fiber patchcord - LC to LC - 2m	
15454-MPO-8LC-2=	Multi-fiber patchcord - MPO to 8xLC - 2m	
15454-MPO-8LC-4=	Multi-fiber patchcord - MPO to 8xLC - 4m	
15454-MPO-8LC-6=	Multi-fiber patchcord - MPO to 8xLC - 6m	
15454-MPO-8LC-8=	Multi-fiber patchcord - MPO to 8xLC - 8m	
15454-MPO-MPO-2=	Multi-fiber patchcord - MPO to MPO - 2m	
15454-MPO-MPO-4=	Multi-fiber patchcord - MPO to MPO - 4m	
15454-MPO-MPO-6=	Multi-fiber patchcord - MPO to MPO - 6m	
15454-MPO-MPO-8=	Multi-fiber patchcord - MPO to MPO - 8m	
15454-MPO-XMPO-2=	Multi-fiber patchcord - MPO to MPO Xcrossed - 2m	
15454-SC-SC-2=	SC to SC fiber patchcord-2m(duplex)	

Product Number	Description	Comment
15454-YCBL-LC=	15454 - 2RU Y-Cable Drawer (8 Modules positions)	
15454-YCM-MM-LC=	15454 - Y-Cable Module - MM - LC (1 channel)	
15454-YCM-SM-LC=	15454 - Y-Cable Module - SM - LC (1 channel)	
NCS2K-MF-2LC-ADP=	Double LC-LC Adapter MF Unit	
NCS2K-MF-2MPO-ADP=	Double MPO-16 to 2xMPO-8 Adapter MF Unit - Monitoring	
ONS-12MPO-MPO-2=	Multi-fiber patchcord - MPO to MPO 12 fibers - 2m	To be used as connection between QSFP+ an 4x10G and NCS2K-MF-8X10G-FO=
ONS-12MPO-MPO-4=	Multi-fiber patchcord - MPO to MPO 12 fibers - 4m	To be used as connection between QSFP+ 4x10G and NCS2K-MF-8X10G-FO=
ONS-12MPO-MPO-6=	Multi-fiber patchcord - MPO to MPO 12 fibers - 6m	To be used as connection between QSFP+ an 4x10G and NCS2K-MF-8X10G-FO=
ONS-12MPO-MPO-8=	Multi-fiber patchcord - MPO to MPO 12 fibers - 8m	To be used as connection between QSFP+ an 4x10G and NCS2K-MF-8X10G-FO=
ONS-12MPO-XMPO-2=	Multi-fiber patchcord - MPO to MPO Xcrossed - 2m	
ONS-12MPO-XMPO-4=	Multi-fiber patchcord - MPO to MPO Xcrossed - 4m	
ONS-12MPO-XMPO-6=	Multi-fiber patchcord - MPO to MPO Xcrossed - 6m	
ONS-12MPO-XMPO-8=	Multi-fiber patchcord - MPO to MPO Xcrossed - 8m	
ONS-16MPO-MPO-2=	Multi-fiber patchcord - MPO to MPO 16 fibers - 2m	
ONS-16MPO-MPO-4=	Multi-fiber patchcord - MPO to MPO 16 fibers - 4m	
ONS-16MPO-MPO-6=	Multi-fiber patchcord - MPO to MPO 16 fibers - 6m	
ONS-16MPO-MPO-8=	Multi-fiber patchcord - MPO to MPO 16 fibers - 8m	
ONS-MPO-16LC-2=	16-fiber MPO to 16xLC Fan-Out MPO cable - 2m	To be used as Fan out from NCS2K-20-SMRFS-CV=and NCS2K-20-SMRFS= A/D Ports
ONS-CCC-100G-10=	CXP-CFP MPO cable, 10m long	
ONS-CCC-100G-20=	CXP-CFP MPO cable, 20m long	
ONS-MPO-MPOLC-10=	24-MPO to Two 12-MPO and Four LC cable, 10m	To be used with NCS2K-MR-MXP= Line card to provide fan out from face plate pluggable
ONS-MPO-MPOLC-2=	24-MPO to Two 12-MPO and Four LC cable, 2m	To be used with NCS2K-MR-MXP= Line card to provide fan out from face plate pluggable
ONS-MPO24-2MPO12=	Two 40G SR4 to 100G SR10, 2x12MPO-24MPO 20m CPAK cable	To be used on CPAK SR10 with NCS2K-100G-CK-C=to support 2x40G SR4 over 100G application
NCS2K-HP-LC-2=	E2000 High-Power to LC patch cord - 2m	Used in Raman Amplifiers

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