



Product Overview

The Cisco IE 4010 switch provides a rugged and secure switching infrastructure for harsh environments. It is suitable for industrial Ethernet applications, including process manufacturing, utility substations, intelligent transportation systems (ITSs), rail transportation, and other similar deployments.

In industrial environments, you can connect the switch to any Ethernet-enabled industrial communication devices, including programmable logic controllers (PLCs), human-machine interfaces (HMIs), drives, sensors, and input and output (IO) devices.

In utility substations the switch can connect to devices such as Intelligent Electronic Devices (IEDs), distributed controllers, substation routers, Cisco IP Phones, Cisco Wireless Access Points, and other network devices such as redundant substation switches.

For detailed specifications, see the [IE 4010 Data Sheet](#).

This chapter contains the following sections:

- [Switch Models, on page 1](#)
- [Cable Side, on page 2](#)
- [Power-Supply Side, on page 11](#)
- [Management Options, on page 13](#)

Switch Models

Table 1: Switch Models

Model	Total Ports	Uplinks	SFP Fiber Ports	Copper 10/100/1000 PoE+ Ports ¹	Default Software License	Power Supplies
IE-4010-16S12P	28	4 SFP (100MB/1G)	12 (100/1000M)	12 (10/100/1000M)	LAN Base ²	Support for 2 field-replaceable, redundant AC or DC power supplies.

Model	Total Ports	Uplinks	SFP Fiber Ports	Copper 10/100/1000 PoE/PoE+ Ports ¹	Default Software License	Power Supplies
IE-4010-4S24P	28	4 SFP (100MB/1G)	—	24 (10/100/1000M)	LAN Base	Support for 2 field-replaceable, redundant AC or DC power supplies.



Note ¹All copper Gigabit Ethernet interfaces support speed negotiation to 10/100/1000 mbps and duplex negotiation. Ethernet 4010 Series.



Note ²Can be upgraded to IP Services at a fee. IP Services License Product Numbers are the following: L-IE4000-RTU= (Electronic SW License for IE4000 Switches)

Cable Side

Figure 1: Cisco IE-4010-16S12P Cable-Side View

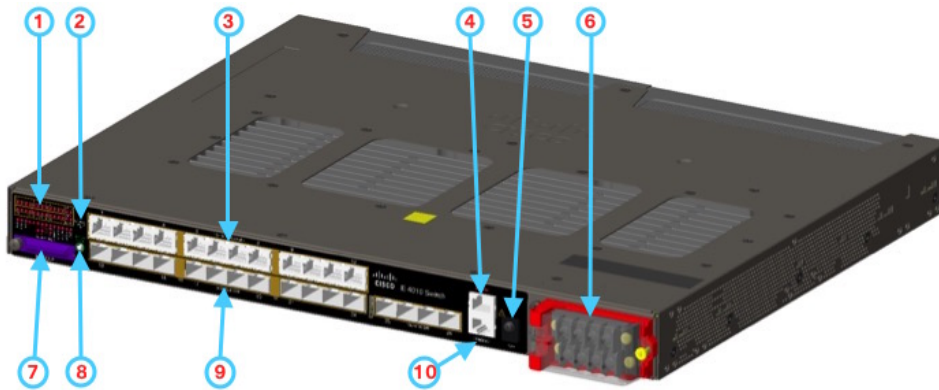


Table 2:

1	LEDs
2	Express Setup button
3	Twelve 10/100/1000 PoE/PoE+ Ports (Downlinks)
4	Alarm port
5	USB (mini-Type B) console port
6	Power-input terminal

7	Flash memory card slot
8	Display mode button
9	Twelve 100/1000 SFP Ports
10	Console port

For detailed information see [Port LEDs](#).

10/100/1000 PoE/PoE+ Ports (Downlinks)

You can set the 10/100/1000 ports on the switch to operate in any combination of half duplex, full duplex, or 10 or 100 Mb/s. You can set the ports for speed and duplex autonegotiation. The default setting is autonegotiate.

When set for autonegotiation, the switch determines the speed and duplex settings of the attached device and advertises its own capabilities. If the connected device also supports autonegotiation, the switch negotiates the best connection (the fastest line speed that both devices support and full-duplex transmission if the attached device supports it) and configures itself accordingly. In all cases, the attached device must be within 328 feet (100 meters).



Warning Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security.

Statement 1072

The 10/100/1000 PoE ports on the Cisco IE-4010 switches provide PoE support for devices that are compliant with IEEE 802.3af/802.3at. The Cisco prestandard PoE is also supported for Cisco IP Phones and Cisco Aironet Access Points. The PoE ports on the switch deliver up to 30 W of PoE+ power. All twelve ports are PoE ports and can be assigned a port priority.

When both power-supply modules are installed, the system has enough power to support all twelve ports as PoE ports. The maximum available PoE power is 200W.

With one power module installed, the maximum available PoE power is 80W. In case one power-supply module fails, the power to the low priority PoE ports is dropped, while power to the high priority PoE ports remains uninterrupted.

On a per-port basis, you control whether or not a port automatically provides power when an IP phone or an access point is connected.

The 10/100/1000 PoE ports use RJ-45 connectors with Ethernet pinouts. The maximum cable length is 328 feet (100 meters). The 100BASE-TX and 1000BASE-T traffic requires CA5, CAT5e, or CAT6 unshielded twisted pair (UTP) cable. The 10BASE-T traffic can use CAT3 or CAT4 UTP cable.

For information about configuring and monitoring PoE ports, see the switch software configuration guide on Cisco.com.

For information about port connections and port specifications, see [Connecting Devices to the Ethernet Ports](#).



Note The output of the PoE circuit has been evaluated as a Limited Power Source (LPS) per IEC 60950-1.

Alarms

The switch has four alarm inputs and one alarm output.

Alarm Input

The alarm input is a dry-contact alarm port. You can connect up to four alarm inputs from devices, such as a door, a temperature gauge, or a fire alarm, to the alarm port. You can use the CLI to set the alarm severity to minor, or major. An alarm generates a system message and turns on an LED. See the ??? for the LED descriptions.

Alarm Output

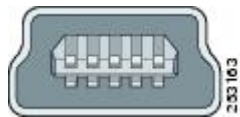
The alarm output can be configured as a major alarm. Output alarms often control an external alarm, such as a bell or a light. To connect an external alarm device to the relay, you connect two relay contact wires to complete the electrical circuit. See for information on the alarm pinouts. see the [Alarm Port](#).

Mini USB Port



Note The 5-pin mini-Type B connectors resemble the 4-pin mini-Type B connectors. They are not compatible. Use only the 5-pin mini-Type B.

Figure 2: USB Mini-Type B Port



The configurable inactivity timeout reactivates the RJ-45 console port if the USB console port is activated, but no input activity occurs on it for a specified time period. When the USB console port deactivates due to a timeout, you can restore its operation by disconnecting and reconnecting the USB cable. For information on using the CLI to configure the USB console interface, see the switch software guide.

SD Flash Memory Card

The switch supports a flash memory card that makes it possible to replace a failed switch without reconfiguring the new switch. The slot for the flash memory card is on the front of the switch. The flash card is hot swappable and can be accessed on the front panel in non hazardous locations only. A cover protects the flash card and holds the card firmly in place. The cover is hinged and closed with a captive screw. This prevents the card from coming loose and protects against shock and vibration.

For more information on inserting and removing the flash memory card, see [Power-Supply Side, on page 11](#).

Display Mode Button

The Display Mode Button allows you to choose the mode you want displayed by the port LEDs. The LEDs with green text to the left of the Button indicate the chosen display mode. Each time you press the switch, the mode indicator moves from SPEED, DUPLX, REDUN, SYNCE, and PoE respectively.

Power-Input Terminal

The power-input terminal provides screw terminals for the AC and DC power connections. The switch can operate with one or two power supplies. If one of the power sources fail, the other continues to power the switch. See [Power Supply Installation](#) for information.

Figure 3: Power-Input Terminal



100/1000 SFP Ports

The switch Ethernet SFP modules provide connections to other devices. These field-replaceable transceiver modules provide the interfaces. The IE 4010 supports both FE and GE optics. SFP modules have local connectors (LCs) for fiber-optic connections or RJ-45 connectors for copper connections.

For the most up-to-date list of supported SFP models, see the [IE 4010 Data Sheet](#).

For information about SFP modules, see your SFP module documentation and the [Installing and Removing SFP Modules](#). For more information about SFP/SFP+ modules and cables, see [Transceiver Modules](#).

Console Ports

You can connect the switch to a PC running Microsoft Windows or to a terminal server through either the RJ-45 console port or the USB console port.

- RJ-45 console port. The RJ-45 connection uses an RJ-45-to-DB-9 female cable.
- USB mini-Type B console port (5-pin connector). The USB connection uses a USB Type A-to-5-pin mini-Type B cable.

The USB console interface speeds are the same as the RJ-45 console interface speeds.

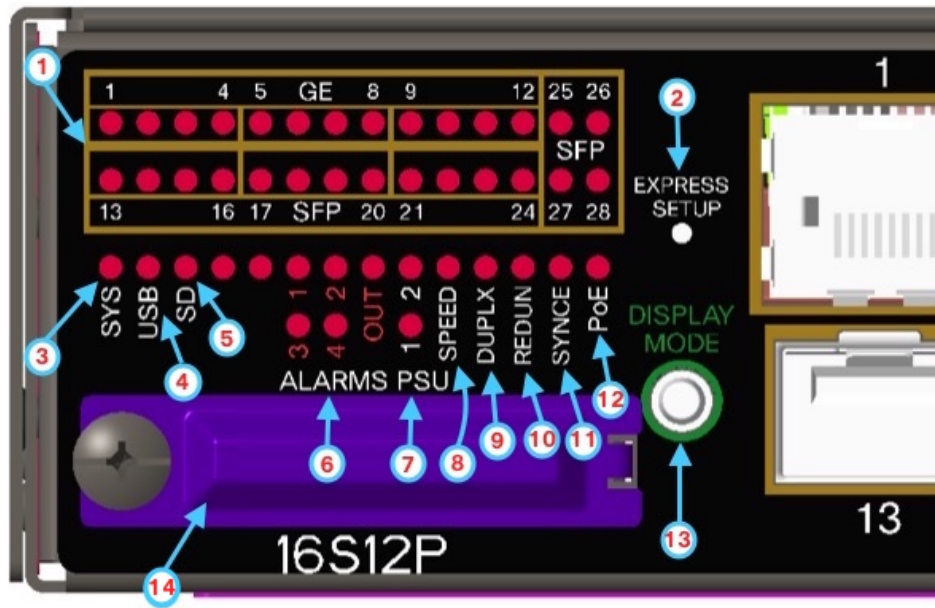
To use the USB console port, you must install the Cisco Windows USB device driver on the device that is connected to the USB console port (device running with Microsoft Windows). See [Installing the Cisco Microsoft Windows XP, 2000, Vista, 7, 8, and 10 USB Device Driver](#) for more information.

With the Cisco Windows USB device driver, connecting and disconnecting the USB cable from the console port does not affect Windows HyperTerminal operations. Mac OS X or Linux require no special drivers.

Switch Panel LEDs

You can use the switch system and port LEDs to monitor switch activity and performance.

Figure 4: Switch LEDs (Cable Side)



1	Port Status LEDs 1-28
2	Express Setup button
3	SYS (system)
4	USB (mini-USB console)
5	SD (SD flash memory card)
6	Alarm Status (1 to 4 and Output).
7	PSU1 and 2 (power supply 1 and 2)
8	Port speed status
9	Port duplex status
10	Redundancy status

11	Synchronous Ethernet status
12	PoE
13	Display mode switch
14	SD card slot cover

Port LEDs

Each Ethernet port has a port LED. These port LEDs, display information about the individual ports. The port mode determines the type of information shown by the port LEDs. The following table lists the mode LEDs and their associated port modes and meanings

Table 3: Port Mode LEDs

Mode LED	Port Mode	Description
All Off	Port status	The port status. This is the default mode.
SPEED	Port speed	The port operating speed: 10, 100, 1000 mbps or 10 Gbps.
DUPLX	Port duplex mode	The port duplex mode: full duplex or half duplex.
REDUN	Redundancy status	Parallel Redundancy Protocol (PRP) status.
SYNCE	Synchronous Ethernet status	Not supported by software yet. Mode button skips this LED.
PoE	PoE+ port power	The PoE+ port status.

To select or change a mode, press the Mode button until the desired mode is highlighted. The Mode LED will turn ON solid green when a mode is selected and turn OFF when timeout (5 seconds) or a different mode is selected. When you change port modes, the meanings of the port LED colors also change. The following table explains how to interpret the port LED colors in different port modes.

Table 4: Meaning of Switch LED Colors in Different Modes

Port Mode LED	Port LED Color	Meaning
All Off	Off	No link, or port was administratively shut down.
	Green	Link present, no activity.
	Blinking green	Activity. Port is sending or receiving data.
	Alternating green-amber	Link fault. Error frames can affect connectivity, and errors such as excessive collisions, CRC errors, and alignment and jabber errors are monitored for a link-fault indication.
	Amber	Port is blocked by Spanning Tree Protocol (STP) and is not forwarding data. After a port is reconfigured, the port LED can be amber for up to 30 seconds as STP checks the switch for possible loops.
Speed	10/100/1000/SFP ports	
	Downlink Ports	
	Off	Port is not operating.
	Amber	Port is operating at 10 Mb/s.
	Green	Port is operating at 100 Mb/s.
	Flashing green	Port is operating at 1000 Mb/s.
	Uplinks Ports	
	Green	Port is operating at 1000 Mb/s.
DUPLX (duplex)	Off	Port is not operating.
	Amber	Port is operating in half duplex.
	Green	Port is operating in full duplex.

Port Mode LED	Port LED Color	Meaning
REDUN	Green	One or more redundancy protocols are configured and active (for example, HSR, DLR, PRP, etc.)
	Blinking amber	One or more redundancy protocols are indicating a redundancy fault.
	Fast blinking green	The port LEDs are showing ports that are participating in a redundancy protocol and the redundancy fault status of that port.
SYNCE	Off	
PoE/PoE+	Off	PoE/PoE+ is off.
	Green	PoE/PoE+ is on and all ports function correctly. The port LED is green when the switch port is providing power.
	Alternating green and amber	PoE/PoE+ is on but one of the low priority ports power is disconnected or failed.
	Blinking amber	PoE/PoE+ is on but one of the high priority ports power is disconnected or failed. PoE+ faults occur when noncompliant cabling or powered devices are connected to a PoE+ port. Use only standard-compliant cabling to connect Cisco prestandard IP Phones and wireless access points or IEEE 802.3af/at-compliant devices to PoE+ ports. You must remove from the network any cable or device that causes a PoE+ fault.
	Amber	PoE/PoE+ is on with failures. PoE+ is enabled by default

Display Mode Button

The Display Mode Button allows you to choose the mode you want displayed by the port LEDs. The LEDs with green text to the left of the Button indicate the chosen display mode. Each time you press the switch, the mode indicator moves from SPEED, DUPLX, REDUN, SYNCE, and PoE respectively.

Power-Supply Module LEDs

The switch power-supply module LEDs are labeled PSU1 and PSU2 (on the switch) and PSU OK (on the power-supply module). They show whether power-supply modules 1 and 2 are receiving power.

Table 5: Power Supply Module LEDs

Color	System Status
Off	Power-supply module (1 or 2) is not installed.
Green	Valid input is present, and the output is within the operating range.
Red	Valid input is present, and the output is outside the operating range or is not present.
Blinking red	Power-supply module (1 or 2) is installed but valid input is not present.

Alarm LEDs

Table 6: Alarm LEDs

Color	System Status
1-4 Input Alarms	
Green	Alarm not present
Red	Minor alarm present
Blinking red	Major alarm present
Output Alarm	
Green	Alarm not present
Red	Alarm condition present

SD Flash Memory Card LED

Table 7: SD Flash Card LED

Color	System Status
Fast blinking amber	Unsupported SD flash memory card is detected.
Slow blinking amber	SD flash memory card is not present.
Green	SD flash memory card is functioning.
Blinking green	SD flash memory card transfer in progress.

USB LED

The USB LED indicates the console port is in use.

If you connect a cable to the console port, the switch automatically uses that port for console communication. If you connect two console cables, the USB console port has priority.

Table 8: USB console port LED

Green	USB console port selected
Off	RS232 Console selected

System LED

Table 9: System LED

Color	System Status
Off	System is not powered on.
Blinking green	Power-On Self-Test (POST) is in progress.
Green	System is operating normally.
Red	System is receiving power but is not functioning properly

Power-Supply Side

The power-supply side has the LED panel and two power-supply slots for the removable power supplies.

Figure 5: Switch with Both Power-Supply Modules

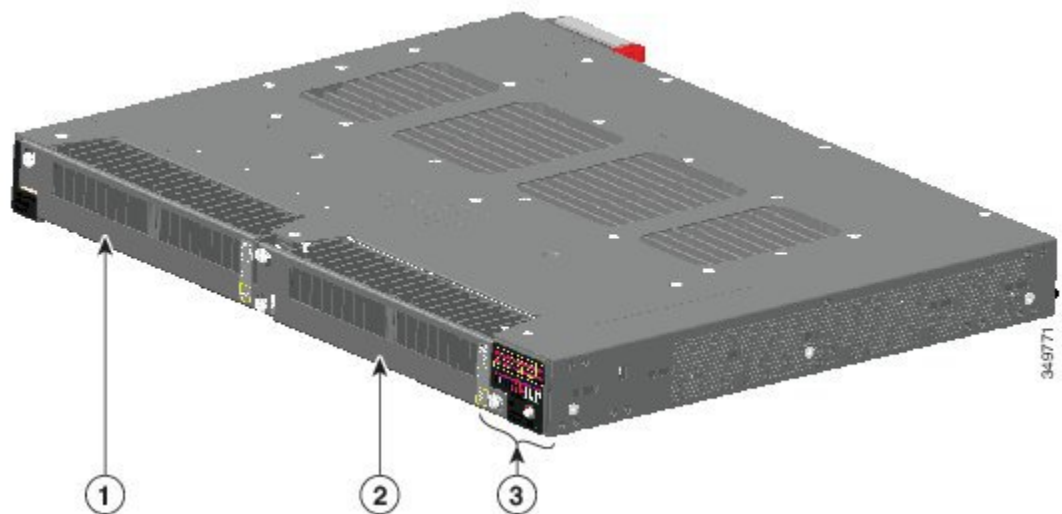


Table 10:

1	Power Supply slot 1
2	Power Supply slot 2
3	LED panel

Power-Supply Side LEDs

These are Similar to Switch LEDs (Cable Side).

Figure 6: Switch LEDs



1-28	Port (Ethernet and SFP respectively) Status LEDs
SYS	System Status
USB	Mini-USB console port status
SD	SD flash memory card status
Alarms 1-4 and OUT	Alarm ports and Alarm Output status
PSU 1-2	Power supply 1 and 2 status
SPEED	Port speed status
DUPLX	Port duplex status

REDUN	Redundancy status
SYNCE	Synchronous Ethernet status
PoE	PoE status
DISPLAY MODE	Display Mode button

For more information about these LEDs, see [Switch Panel LEDs, on page 6](#).

Power Supply Features

The switch has two slots for power-supply modules:

- PWR-RGD-LOW-DC-H: low-voltage DC
- PWR-RGD-AC-DC-H: high-voltage AC or DC

Note: [For detailed specifications, see the IE 4010 Data Sheet](#).



Caution Only the -H version power supplies are certified safe for hazardous environments.

The switch supports these power-supply module combinations:

- Single low-voltage DC
- Single high-voltage AC or DC
- Two high-voltage AC or DC
- Two low-voltage DC
- One high-voltage AC or DC and one low-voltage DC

For information on installing the power-supply modules, see [Power Supply Installation](#).

See [Power-Supply Module LEDs, on page 10](#) for information on the power supply LEDs.

Management Options

Cisco IOS CLI

- You can configure and monitor the switch from the CLI. Connect your management station to the switch console port or use Telnet from a remote management station. See the switch command reference on Cisco.com for information.

SNMP network management

- You can manage switches from a Simple Network Management Protocol (SNMP)-compatible management station. The switch supports a comprehensive set of Management Information Base (MIB) extensions and four Remote Monitoring (RMON) groups. See the switch software configuration guide on Cisco.com and the documentation that came with your SNMP application for information.

Device Manager

- You can use Device Manager, which is in the switch memory, to manage individual and standalone switches. This web interface offers quick configuration and monitoring. You can access Device Manager from anywhere in your network through a web browser. For more information, see the Device Manager online help.

Prime Infrastructure

- Cisco Prime Infrastructure simplifies the management of wireless and wired networks. It offers Day 0 and 1 provisioning, as well as Day N assurance from the branch to the data center. We call it One Management. With this single view and point of control, you can reap the benefits of One Management across both network and compute.

Network Configurations

See the switch software configuration guide on Cisco.com for an explanation of network configuration concepts. The software configuration guide also provides network configuration examples for creating dedicated network segments that are interconnected through Ethernet connections.