



iS5 Communications iSG18GFP

Installation Guide

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This installation guide includes the relevant information for initial installation of the iS5 Communications iSG18GFP switches.

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Introduction

The iS5 Communications Service-aware Industrial Ethernet switch combines a ruggedized Ethernet platform with a unique application-aware processing engine.

As an Industrial Ethernet switch the iS5 Communications switch provides a strong Ethernet and IP feature-set with a special emphasis on the fit to the mission-critical industrial environment such as harsh environment, high reliability and network resiliency.

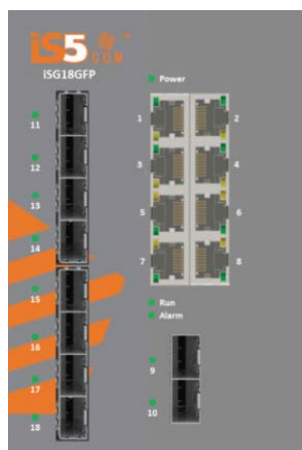
In addition iS5 Communications switches have unique service-aware capabilities that enable an integrated handling of application-level requirements such as implementation of security measures.

Such an integrated solution results in simple network architecture with an optimized fit to the application requirements.

Key Features

The iSG18GFP device offers the following features:

- Wire speed, non-blocking Layer 2 switching
- High-density modular system
- Advanced Ethernet and IP feature-set
- Application-aware firewall per port
- Integrated VPN agent
- Fit to harsh industrial environment
- Supported by a dedicated industrial service management tool (iSIM)
- Multiple interfaces types



Using This Document

Documentation Purpose

This user guide includes the relevant installation and basic management information for the iS5 Communications iSG18GFP.

Intended Audience

This user guide is intended for network administrators responsible for installing and configuring network equipment. Users must be familiar with the concepts and terminology of Ethernet and local area networking (LAN) to use this User Guide.

Explosive Gas Atmospheres related Audience

By using an enclosure of adequate robustness and Ingress Protection Level of IP54 or IP65 it is possible to comply with ATEX Group II Category 3G or 3D suitable for Zone 2 or 22. Users must be familiar with the concepts, terminology and methods of installing apparatus within type 'n', 'd' or 'p' 'tD', 'pD' enclosures as appropriate including cable gland requirements.

Documentation Suite

This document is just one part of the full documentation suite provided with this product.

Document	Function
Initial Setup Guide	Provided with the device in the box. Immediate information required for power up and management availability.
Installation Guide	Contains information about installing the hardware and software; including site preparation, testing, and safety information.
User Guide	Contains information on configuring and using the system.

Conventions Used

The conventions below are used to inform important information:



NOTE

Indicating special information to which the user needs to pay special attention.



CAUTION

Indicating special instructions to avoid possible damage to the product.



DANGER

Indicating special instructions to avoid possible injury or death.

The table below explains the conventions used within the document text:

Conventions	Description
<code>commands</code>	CLI and SNMP commands
<i>command example</i>	CLI and SNMP examples
<i><Variable></i>	user-defined variables
<i>[Optional Command Parameters]</i>	CLI syntax and coded examples

Safety Information



Shock Hazard

To avoid shock, do not perform any servicing other than those contained in the unpacking instructions.



Shock Hazard

HIGH VOLTAGE

Disconnect the product from the power line before removing the cover. Any adjustment and maintenance of the opened device should be done only while the device is disconnected from its source of power and should only be performed by qualified personnel.



Explosive Gas Atmosphere

The product must be installed by a competent installer within a type 'n', 'd', 'p', 'tD', or 'pD' enclosure.



Shock Hazard

HIGH VOLTAGE - EXPLOSIVE GAS ATMOSPHERE

1. Disconnect the product from the power line before removing the enclosure cover. Disconnecting the unit from its power source should be performed only by qualified personnel.



Shock Hazard

GROUNDING - EXPLOSIVE GAS ATMOSPHERE

Verify protective ground connected from the ground terminal of the device to the inner safety ground conductor of the enclosure. Verify that the outer safety ground conductor of the enclosure is connected to the ground conductor of the mains power cord.



Shock Hazard

GROUNDING

Before connecting the product to the power line, make sure that the protective ground terminal of the device is connected to the safety ground conductor of the mains power cord.

The main power supply plug should only be inserted in a socket outlet provided with a connected safety ground. The protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding). Any interruption of the protective (grounding) conductor or disconnection of the protective ground terminal can make the device unsafe to use. Intentional interruption is prohibited.

This equipment has a connection between the earthed conductor of the DC supply circuit and the grounding conductor.



Shock Hazard

LINE VOLTAGE

Before connecting the product to the power line, make sure the voltage of the power source matches the requirements of the product, as marked on the label located near the power connectors.



Shock Hazard

POWER SOURCE

The power source should be protected with a branch circuit over-current protection



Danger

Install this equipment only in a Restricted Access Location per UL 60950-1 clause 1.2.7.3.

**Laser Warning**

The equipment is designed to be used with Class 1 Laser fiber optic transmitters which may endanger your eyes.

Do not look directly into the fiber optic cables or transmitter.

**Laser Warning**

The device is provided with SFP sockets in which fiber optic transceivers may be installed.

In order to meet the safety requirement of Class 1 fiber optic laser emission, use only fiber optic transceivers which comply with IEC 60825-1 or IEC 60825-2 and FDA 21 CFR 1040.10 and CFR 1040.1.

**Caution**

This equipment contains Electrostatic Discharge (ESD) sensitive components. Use ESD protection before servicing or installing components of this system.

**Caution**

Changes or modifications made to this device that are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Caution**

Remove the power cord from a power-supply unit before installing it or remove it from the device. Otherwise, as a result, the power supply or the device could be damaged. (The device can be running while a power supply is being installed or removed, but the power supply itself should not be connected to a power source.)

**Caution**

The unit is designated to operate in environments of up to 70 degrees ambient temperature.

For AC units, under some conditions the housing of the unit might get hot and direct touch should be avoided.

System Description

The iS5 Communications iSG18GFP is a compact switch product family with high L2/L3 switching capability and secure servicing of industrial protocols.

Power Supply Module

Available power input versions and their respective current consumption:

Input Voltage	Max current [A]	
	Version without POE ports	Version with POE ports
24vDC	1.3	4
48vDC	0.7	2
110vAC	0.4	1.2
220vAC	0.2	0.6

For the DC versions two inputs for external sources are available, allowing power redundancy to the unit.



CAUTION

AC Power variants holds double pole/neutral fusing

Input circuit protection

Following are maximum values of upstream fuse / circuit breaker protection

Input Voltage	Max current [A]
24vDC	10
48vDC	5
110vAC	6
220vAC	6

Main Unit

The Main Switch module is responsible for:

- Switch management.
- L2 switching.
- L3 routing.
- Application aware firewall and special services.
- Interfaces on this module are :
 - Ethernet Copper RJ45 ports
 - SFP FO ports.
 - Serial console RJ45 port.
 - USB management port.

I/O interface

The I/O card is holding the following user and network interfaces:

- Serial Asynchrony RS232 ports.
- Discrete IO inputs / outputs.
- Cellular GPRS/UMTS modem.
- Power connectors for DC versions.

Installing the iSG18GFP

This section includes the relevant information for installing the iSG18GFP device.

Package Contents

The iS5 Communications iSG18GFP package includes the following items:

- Basic system including
 - iS5 Communications iSG18GFP module
 - 1x RS-232 console cable (white cable, CBL-TJ45-DB9/S-RPT)
 - USB memory stick

Unpacking

The package contents are factory tested and inspected prior to shipment, however keep the shipping package until the device is installed and verified as operational. In case of damage to the device during shipment, contact iS5 Communications support.

Mounting iS5 Communications iSG18GFP – Non Explosive Environment

The iS5 Communications iSG18GFP is designed as a fixed unit that is connected in its rear side to an industry standard DIN rail and is setup with the DIN-rail mount as the default setup.

Mounting of iS5 Communications iSG18GFP in explosive atmospheres within TYPE 'n', 'd', 'p', 'tD' and 'pD' enclosures

- The iS5 Communications iSG18GFP conforms to the standard IEC 60079-15 for type 'n' protection. When installed in a suitable 'restricted breathing' enclosure meeting the requirements of the protection type 'nR' of the standard, it is suitable for use in a Zone 2 explosive atmosphere. It is also suitable for mounting in enclosures protected according to types of protection 'd', 'p', 'tD' and 'pD' when installed and verified in accordance with the hazardous areas electrical installation standard IEC 60079-14.

- The iS5 Communications iSG18GFP is not suitable for installation in explosive atmospheres without an explosion-protected enclosure. Mounting of iS5 Communications iSG18GFP within enclosures should consider following mandatory requirements:

- The iS5 Communications iSG18GFP is designed as a fixed unit that is connected in its rear side to an industry standard DIN rail and is setup with the DIN-rail mount as the default setup within the enclosure.

- Follow below instructions - Mounting for DIN Rail
- Follow below instructions - Distance kept for natural air flow,

Cable Glands for Mounting iS5 Communications iSG18GFP within TYPE 'n', 'd', 'p', 'tD' and 'pD' enclosures

The iS5 Communications iSG18GFP, when installed within explosion-protected enclosures, its interface cables must be sealed with cable glands suitable for the relevant type of protection installed according to IEC 60079-14.



NOTE

It is the installer responsibility to use proper Cable Glands suitable for the relevant type of protection.

Mounting for DIN Rail

These mounting instructions assume that a standard DIN rail has been previously installed. If one has not then use the installation instructions that come with the DIN rail to mount the DIN rail on the wall.

Locate on the back of the device the DIN mounting brackets.

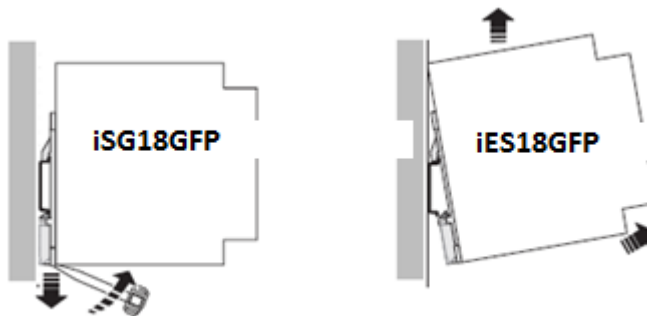
Assembly:

Position the module with the DIN rail guide on the upper edge of the DIN rail, and snap it in with a downward motion.



Removing:

Pull the snap lever open with the aid of a screwdriver and slide the module out at the lower edge of the DIN rail.

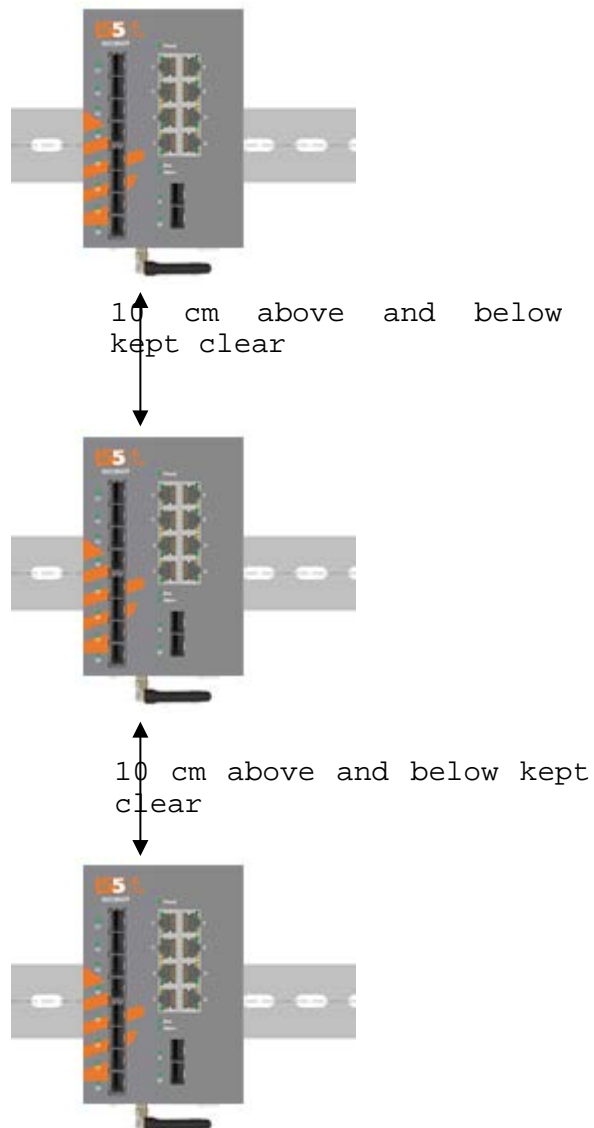


CAUTION

Please observe product installation must be vertical so that bottom side of the device must face downwards towards the floor to enable proper natural air flow

Distance kept for natural air flow

Proper installation requires keeping 10cm distance from top and bottom between the iS5 Communications switch to any other neighbor device for proper cooling using natural air flow.



Grounding

The iSG18GFP chassis ground connection uses a #6-32 Screw. We recommend terminating the ground connection using a #6 ring lug, and a torque setting of 15 in.lbs (1.7Nm). The red outline indicates the location of the chassis ground.



CAUTION

Do not remove the earth connection unless all power supply connections are disconnected.



DANGER

Before connecting power to the platform, make sure that the grounding posts are firmly connected to a reliable ground, as described above.

Connecting to a Power Source

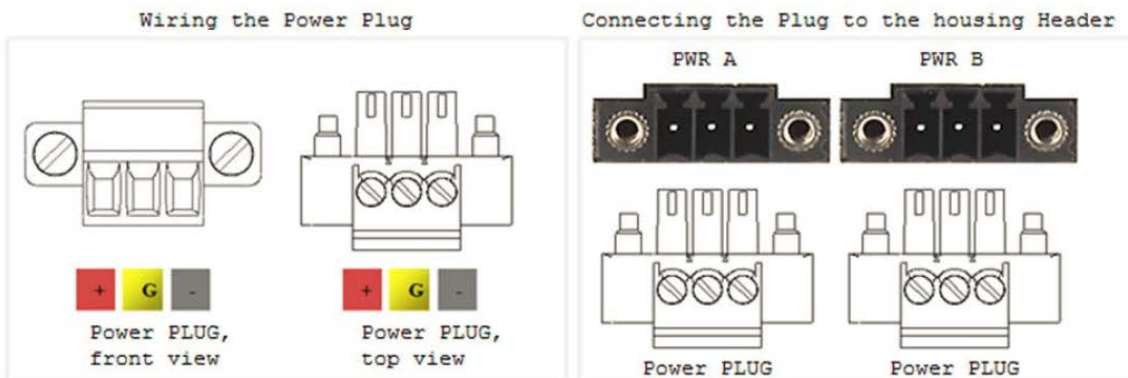
The iSG18GFP router supports dual redundant power supplies (PWR1 and PWR2). There are 3 options for each power supply:

1. LV: Dual Input 18-32VDC
2. MV: Dual Input 36-60VDC
3. HV: Single Input 85-264VAC

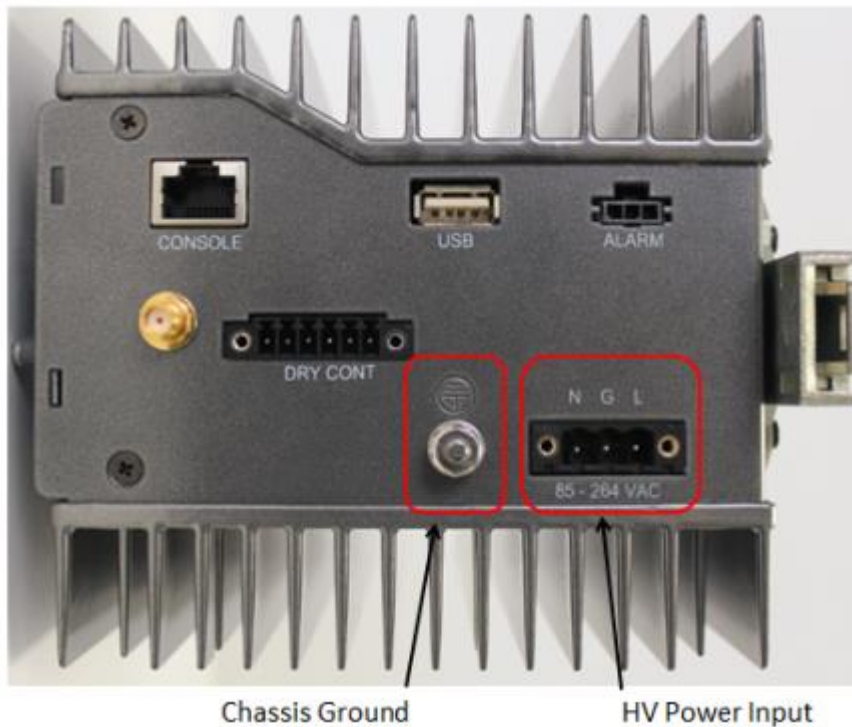
LV and MV Power Connections

There are 2 power inputs marked 'PWR A' and 'PWR B'. For proper operation it is only necessary to connect one power source, either to 'PWR A' or to 'PWR B'. However, for redundancy purposes you may connect 2 different power sources, one at 'PWR A' and the second to 'PWR B'.

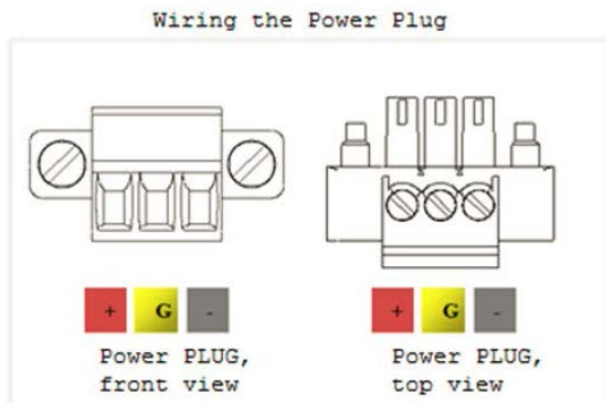
Two plugs are supplied for connecting LV and MV power inputs. Remove 7mm of insulation from each wire and secure the wires to the plugs using the pictures below for wire location. Insert the plug into the iSG18GFP and secure the plug using the 2 screws on each side.

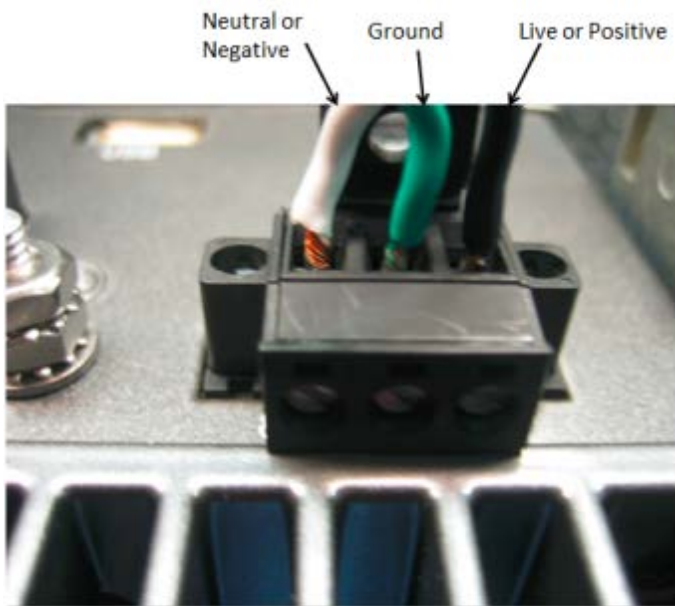


HV Power Connections



Connect the power wires to the black HV Power plug. Strip 7mm of insulation from the end of each wire. Insert the Live or Positive (+) wire into the position that aligns with the 'L' on the iSG18GFP and tighten the screw. Insert the Ground wire into the position that aligns with the 'G' on the iSG18GFP (middle position) and tighten the screw. Insert the Neutral or Negative (-) wire into the position that aligns with the 'N' on the iSG18GFP and tighten the screw.





Insert the HV Power Input connector into the iSG18GFP. Secure it with the 2 screws on each side.



CAUTION

- **100-240VAC rated equipment:** A 250VAC appropriately rated circuit breaker must be installed.
- Equipment must be installed according to the applicable country wiring codes.

**CAUTION**

- A circuit breaker is not required for DC power supply voltages of 18-48VDC.
- For Dual DC power supplies, separate circuit breakers must be installed and separately identified.
- Equipment must be installed according to the applicable country wiring codes.

**CAUTION**

Use a grounding wire of at least 10 American Wire Gauge (AWG).

Attach the 10 AWG wire to an agency-approved crimp connector, crimped with the proper tool. The crimp connector should be secured to both ground screws on the enclosure.

**CAUTION**

For the input circuit to the system, make sure there is a proper circuit protection, on the input to the terminal block. Max current consumption for each product variant is given in this document.

**DANGER**

The unit does not have a Power On/Off button and is automatically turned on when the cabling is completed and the power to the feed line is turned on. Before wiring the power plug or connecting power to the device, verify that the power to the feed lines is turned off at the supply circuit-breaker or disconnected from the power bus.

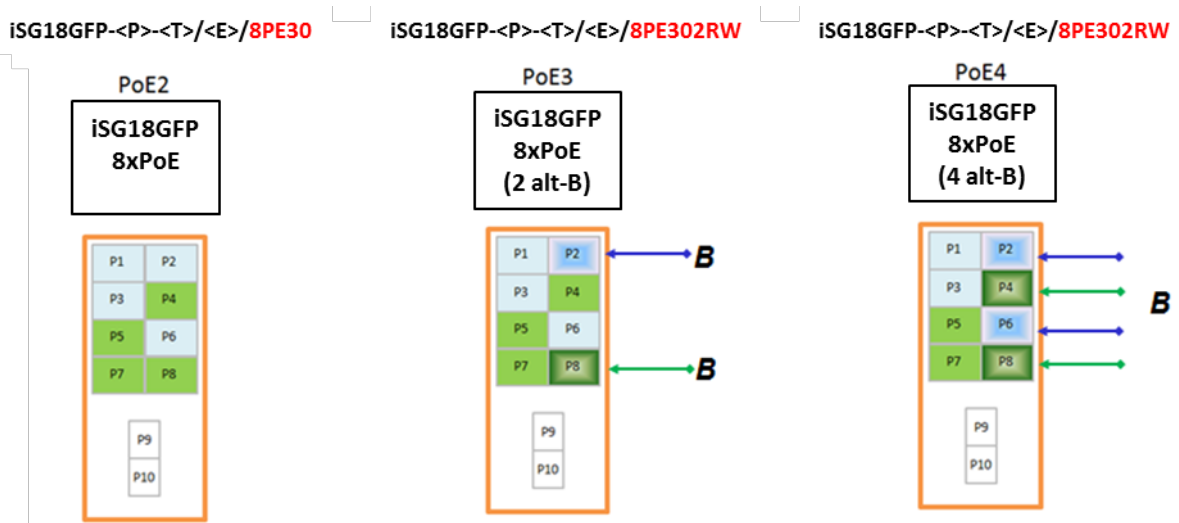
POE Ports

Depending on your hardware variant POE ports might be applicable.

Hardware supporting POE is named:

- iS5-iSG18GFP-<P>-<T>/<E>/8PE30/<R>/<C> - hardware includes 8 POE support on the FE Ethernet ports 1-8. All POE ports are wired as Alternative-A (PoE runs on the FE twisted pairs)
- iS5-iSG18GFP-<P>-<T>/<E>/8PE302RW/<R>/<C> - hardware includes 8 POE support on the FE Ethernet ports 1-8. Ports 2 and 8 are wired as Alternative-B (PoE runs on the spare twisted pairs)
- iS5-iSG18GFP-<P>-<T>/<E>/8PE304RW/<R>/<C> - hardware includes 8 POE support on the FE Ethernet ports 1-8.

Ports 2,4,6,8 are wired as Alternative-B (PoE runs on the spare twisted pairs)



Power Management of POE

1. The 8 POE ports supports in total maximum power output of:
 - a. For 12Vdc powered units (iS5-iSG18GFP-24../PE) : 60w
 - b. For 24Vdc powered units (iS5-iSG18GFP-24../PE) : 80w
 - c. For 48Vdc powered units (iS5-iSG18GFP-48../PE) : 120w
 - d. For AC powered units (RF-iSG18GFP-AC../PE) : 120w
2. The 8 POE ports divided to 2 groups ,each group supports maximum power output of:
 1. For 12Vdc powered units (iS5-iSG18GFP-24../PE) : 30w
 2. For 24Vdc powered units (iS5-iSG18GFP-24../PE) : 40w
 3. For 48Vdc powered units (iS5-iSG18GFP-48../PE) : 60w
 4. For AC powered units (iS5-iSG18GFP-AC../PE) : 60w
5. The group division is as follows:
 - a. Group 1: p1,p2,p3,p6
 - b. Group 2: p4,p5,p7,p8

Modes of POE

Alternative-A wired ports will supply POE power on demand. A non-POE equipment connected to such port is protected as it will not receive power over the Fast Ethernet communication lines.

Alternative-B wired ports will supply POE power constantly (forced mode) when enabled.



CAUTION

Alternate-B POE ports work in forced mode and provides constant power on the twisted pair lines. Make sure to connect only adequate equipment to these ports

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The Switch Led indicators

Interface	status	meaning
PWR	Off Green	No power Power on
Eth 1-8 Link led	Off Green	Port administratively Disable or no link connected to it Enable and link up
Eth 1-8 ACT led	Off Yellow (blinking)	Port administratively Disable or no link connected to it Traffic
SFP	Off Red Green (static) Green (blinking)	Port administratively Disable Enable , no SFP present SFP present Traffic
Serial 1-4 Link led	Off Green	Disable Enable
Serial 1-4 Link led	Off Yellow (blinking)	No traffic Traffic
Cellular C1	Off Green Green (blinking)	GPRS disable SIM inserted GPRS enabled SIM connected/Traffic
Run	Off Red Green (blinking) Green	No power or in early boot stage Faulty During start-up Normal operation ,system up
Alm	Off Red	System processes ok A System process alarm

Switch Configuration

Connecting to the Console Port

Connecting the device to a PC using the Console Port:

1. Connect the RJ-45 connector of the console cable to the device's **Console Port (CON)**. The console cable is colored **white** and is supplied with the device. Other serial **grey** cables which might be supplied with the device are for use with the user serial port and should not be connected to the console port.
2. Connect the other side of the cable to the PC com port.
3. Supported emulation types of the terminal : ANSI ,ANSIW ,VT100 ,TTY/
4. Configure the PC com port to 9600-N-8-1 (9600 bps, no parity,8 data bits, 1 stop bit, no flow control) and connect.

Below table details the console cable pinout.

RJ45 Male	DB9 Female
1	-
2	3
3	2
4	5
5	5
6	-
7	-
8	-



NOTE

Default user name : su

Default password : 1234

Using the Command Line Interface (CLI)

The CLI is a network management application operated through an ASCII terminal.

Using the CLI commands, users can configure the device parameters and maintain them, receiving text output on the terminal monitor. These system parameters are stored in a non-volatile memory and users have to set them up only once

The device CLI is password protected.

Accessing the CLI

Accessing the CLI:

- Direct connection of a PC to the device's console port
- Telnet or SSH over an IP network

Once the console port is displayed, use the administrator username and password to access the CLI.

The CLI Modes

The CLI is structured from hierarchical modes, each mode grouping relevant CLI commands.

Its two top level modes are:

- Root mode
- GCE Configuration mode
- ACE Application mode

Root Mode

This is the initial mode that the CLI enters after a successful login to the CLI.

```
iSG18GFP#
```

The Operational mode is primarily used for:

- viewing the system status
- monitoring and troubleshooting network connectivity

GCE Configuration Mode

The Configuration mode is the mode in which users can change the device configuration.

To enter this mode from Operational mode, use the **config terminal** command.

```
iSG18GFP#config terminal
```

```
iSG18GFP(config)#
```

The Configuration mode has various sub-modes for configuring the different device features.

ACE Application Mode

The application mode is the mode in which users can configure and manage iS5 Communications extended features as VPN ,Gateway ,Serial services and Firewall.

```
iSG18GFP#application connect
```

```
[/]
```

Committing Configuration Commands

The commands executed in the Configuration mode **are** applied to the device's active configuration (the running configuration file) immediately upon entry. These commands are applied to a copy of the active configuration. The configuration made by the user can be saved in the Flash and can be restored when the switch is started.

```
iSG18GFP# write startup-cfg
```

Using the CLI

Command Keywords and Arguments

A CLI command is built up of a series of keywords and arguments:

- Keywords identify the command's action
- Arguments specify the command's configuration parameters
- The CLI commands are not case sensitive.

The general CLI syntax is represented by the following format:

```
iSG18GFP[(config- ...)]#keyword(s) [argument(s)] ... [keyword(s)]  
[argument(s)]
```

In this format

iSG18GFP[(config ...)]# represents the prompt displayed by the device. This prompt includes:

- the user-defined **iSG18GFP**
- the current CLI mode
- the command keywords and arguments typed by the user

Minimum Abbreviation

The CLI accepts a minimum number of characters that uniquely identify a command; therefore abbreviations for commands and parameters can be used as long as they contain enough letters to differentiate them from any other available commands or parameters in the specific CLI mode.

In case of an ambiguous entry (when the CLI mode includes more than one command matching the characters typed), the system prompts for further input.

Dynamic Completion of Commands

In addition to the Minimum Abbreviation functionality, the CLI can display the commands' possible completions.

To display possible command completions, type the partial command followed immediately by **<Tab>** or **<Space>**.

In case the partial command uniquely identifies a command, the CLI displays the full command.

Otherwise the CLI displays a list of possible completions.

Getting Help

To get specific help on a command mode, keyword, or argument, use one of the following commands or characters:

Command	Purpose
help	Provides a brief description of the help system in any command mode.
abbreviated-command<Tab>	To display a command's possible completions, type the partial command followed immediately by <Tab> or <Space>. If the partially typed command uniquely identifies a command, the full command name is displayed. Otherwise, the CLI displays a list of possible completions:
command? or abbreviated-command?	(Leave no space between the command and ?) Provides a list and description of commands that begin with a particular string:
?	Lists all commands available in the current command mode.

Default IP address

- By default upon delivery all ports are members of Vlan 1 and are accessible via
- Default Inband IP 10.0.0.1/8 to SSH management.
- Your computer should reside on the same IP network and be connected to any of the switch ports directly or via a network.
- Telnet is blocked by default but can be enabled. Please see user guide.

Changing the vlan 1 IP address

1. Change the IP interface address


```
interface vlan 1
shutdown
ip address aa.bb.cc.dd xxx.xxx.xxx.xxx
no shutdown
end
```



```
write startup-cfg
iSG18GFP# show ip interface
```

Setting static route as default gateway

1. Create static route (default gateway to your next hop aa.bb.cc.dd)

```
Config
ip route 0.0.0.0 0.0.0.0 aa.bb.cc.dd 1
end
```

Activating telnet

```
Config
feature telnet
end
```

Activating the Web Interface

1. Create static route (default gateway)

```
Config
set ip http enable
end
```

2. Open the web browser and type the switch ip (default 10.0.0.1)