

## Introduction

The IES-P3073GC series is a powerful managed industrial switch designed for extreme temperatures, dusty environments and high humidity. The series comprises the high-voltage and low-voltage models to meet different power supply needs. With IEC61850-3 and IEEE1613 compliance, the switch is especially ideal for power substation applications. Featuring seven 10/100Base-T(X) ports and three Gigabit combo ports (RJ-45 connectors for 10/100/1000BASE-T(X) and SFP slots), the IES-P3073GC series can be managed centrally via web browsers, TELNET, Console or other third-party SNMP software as well as ORing's proprietary Open-Vision management utility.

## Package Contents

The IES-P3073GC series are shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

| Contents                            | Pictures | Number |
|-------------------------------------|----------|--------|
| IES-P3073GC-HV<br>or IES-P3073GC-LV |          | X 1    |
| CD                                  |          | X 1    |
| DIN-rail Kit                        |          | X 1    |
| Wall-mount Kit                      |          | X 2    |
| Console Cable                       |          | X 1    |
| QIG                                 |          | X 1    |
| Power Cable<br>(For IES-P3073GC-HV) |          | X 2    |

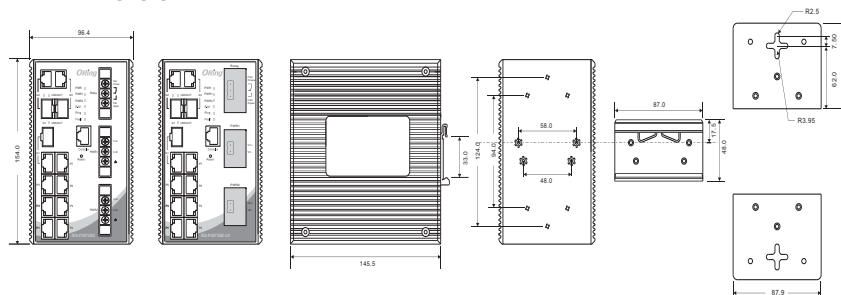
## Preparation

Before you begin installing the device, make sure you have all of the package contents available and a PC with Microsoft Internet Explorer 6.0 or later, for using web-based system management tools.

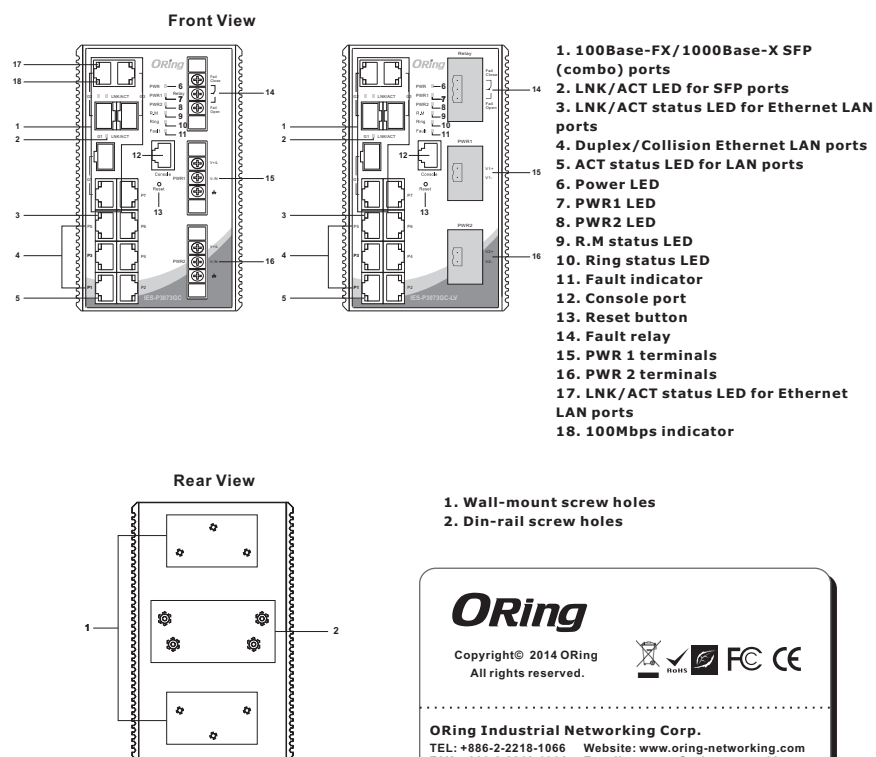
### Safety & Warnings

- Elevated Operating Ambient:** If installed in a closed environment, make sure the operating ambient temperature is compatible with the maximum ambient temperature (T<sub>ma</sub>) specified by the manufacturer.
- Reduced Air Flow:** Make sure the amount of air flow required for safe operation of the equipment is not compromised during installation.
- Mechanical Loading:** Make sure the mounting of the equipment is not in a hazardous condition due to uneven mechanical loading.
- Circuit Overloading:** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

### Dimension



### Panel Layouts



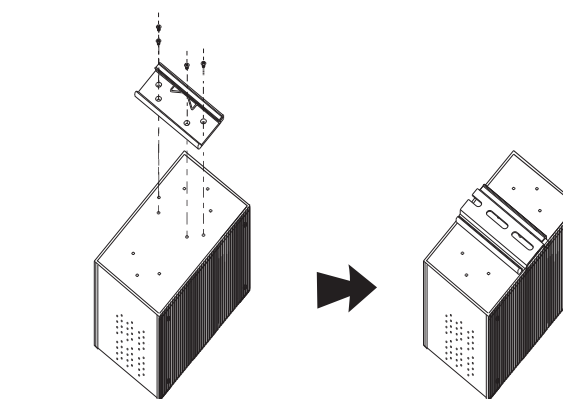
## Installation

Use the mounting kits attached with the package and follow the steps below to install the switch to a rail or to the wall.

### DIN-rail Installation

**Step 1:** Slant the switch and screw the Din-rail kit onto the back of the switch, right in the middle of the back panel.

**Step 2:** Slide the switch onto a DIN-rail from the Din-rail kit and make sure the switch clicks into the rail firmly.



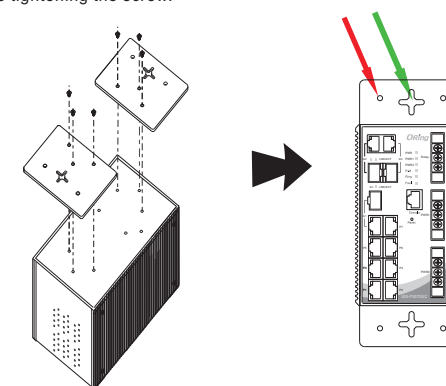
### Wall-mounting

**Step 1:** Screw the two pieces of wall-mount kits onto both ends of the rear panel of the switch. A total of six screws are required, as shown below.

**Step 2:** Use the switch, with wall mount plates attached, as a guide to mark the correct locations of the four screws.

**Step 3:** Insert screws through the round screw holes (the red arrow as below) on the sides or through the cross-shaped aperture (the green arrow as below) in the middle of the plate and fasten the screw to the wall with a screwdriver.

**Step 4:** If the screw goes through the cross-shaped aperture, slide the switch down before tightening the screw.



Instead of screwing the screws in all the way, it is advised to leave a space of about 2mm to allow room for sliding the switch between the wall and the screws.

### Network Connection

The IES-P3073GC series have standard Ethernet ports. According to the link type, the switch uses CAT 3,4,5,5e UTP cables to connect to any other network devices (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

### Cable Types and Specifications:

| Cable      | Type                         | Max. Length        | Connector |
|------------|------------------------------|--------------------|-----------|
| 10BASE-T   | Cat. 3, 4, 5 100-ohm         | UTP 100 m (328 ft) | RJ-45     |
| 100BASE-TX | Cat. 5 100-ohm UTP           | UTP 100 m (328 ft) | RJ-45     |
| 1000BASE-T | Cat. 5 / Cat. 5e 100-ohm UTP | UTP 100 m (328 ft) | RJ-45     |

For pin assignments for different types of cables, please refer to the following tables.

| 1000 Base-T RJ-45 |            | 10/100 Base-T(X) RJ-45 |            |
|-------------------|------------|------------------------|------------|
| Pin Number        | Assignment | Pin Number             | Assignment |
| 1                 | BI_DA+     | 1                      | TD+        |
| 2                 | BI_DA-     | 2                      | TD-        |
| 3                 | BI_DB+     | 3                      | RD+        |
| 4                 | BI_DC+     | 4                      | Not used   |
| 5                 | BI_DC-     | 5                      | Not used   |
| 6                 | BI_DB-     | 6                      | RD-        |
| 7                 | BI_DD+     | 7                      | Not used   |
| 8                 | BI_DD-     | 8                      | Not used   |

Most users configure these ports for Auto MDI/MDI-X mode, in which case the port's pinouts are adjusted automatically depending on the type of Ethernet cable used and the type of devices connected to the port. Below are the pin assignments for both MDI ports and MDI-X ports

| 10/100 Base-T(X) MDI/MDI-X |               |               | 1000Base-T MDI/MDI-X |          |            |
|----------------------------|---------------|---------------|----------------------|----------|------------|
| Pin Number                 | MDI port      | MDI-X port    | Pin Number           | MDI port | MDI-X port |
| 1                          | TD+(transmit) | RD+(receive)  | 1                    | BI_DA+   | BI_DB+     |
| 2                          | TD-(transmit) | RD-(receive)  | 2                    | BI_DA-   | BI_DB-     |
| 3                          | RD+(receive)  | TD+(transmit) | 3                    | BI_DB+   | BI_DA+     |
| 4                          | Not used      | Not used      | 4                    | BI_DC+   | BI_DD+     |
| 5                          | Not used      | Not used      | 5                    | BI_DC-   | BI_DD-     |
| 6                          | RD-(receive)  | TD-(transmit) | 6                    | BI_DB-   | BI_DA-     |
| 7                          | Not used      | Not used      | 7                    | BI_DD+   | BI_DC+     |
| 8                          | Not used      | Not used      | 8                    | BI_DD-   | BI_DC-     |

Note: "+" and "-" signs represent the polarity of the wires that make up each wire pair.

### Console Port Pin Definition

To connect the console port to an external management device, you need an RJ-45 to DB-9 cable, which is also supplied in the package. Below is the console port pin assignment information.

| PC (male) pin assignment | RS-232 with DB9 (female) pin assignment (RJ45-DB9 cable) | RJ45 pin assignment |
|--------------------------|--|---------------------|
| PIN#2 Rx/D               | PIN#2 Rx/D   | PIN#2 Rx/D          |
| PIN#3 Tx/D               | PIN#3 Tx/D   | PIN#3 Tx/D          |
| PIN#5 GND                | PIN#5 GND  | PIN#5 GND           |

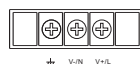
### Wiring

#### Power inputs

The switch supports dual redundant power supplies, Power Supply 1 (PWR1) and Power Supply 2 (PWR2). The connections for PWR1, PWR2 and the RELAY are located on the front panel along with LAN ports. Follow the steps below to wire power cables.

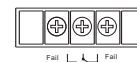
**STEP 1:** Insert the negative/positive wires into the V-/V+ terminals, respectively.

**STEP 2:** To keep the wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the connector.



### Relay contact

The switch provides fail open and fail close options for you to form relay circuits based on your needs. If you want the relay device to start operating at power failure, attach the two wires to COM and fail close to form a close circuit, vice versa. The relay contact of the 3-pin terminal block connector will respond to user-configured events according to the wiring.



### Grounding

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screws to the grounding surface prior to connecting devices.

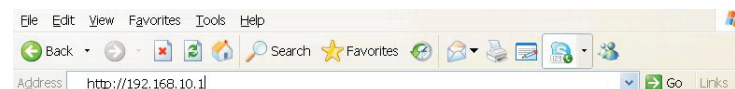
## Configurations

After installing the switch card, the green power LED should turn on. Please refer to the following table for LED indication.

| LED                                 | Color | Status   | Description  |
|-------------------------------------|-------|----------|--|
| PWR                                 | Green | On       | DC power on  |
| PW1                                 | Green | On       | DC power module 1 activated                                      |
| PW2                                 | Green | On       | DC power module 2 activated                                      |
| R.M                                 | Green | On       | System running in Ring Master mode                               |
| Ring                                | Green | On       | System running in Ring mode                                      |
| Ring                                | Green | Blinking | Ring structure is broken (i.e. part of the ring is disconnected) |
| Fault                               | Amber | On       | Faulty relay (power failure or port malfunctioning)              |
| 10/100Base-T(X) Fast Ethernet ports |       |          |  |
| LNK/ACT                             | Green | On       | Ethernet links connected   |
| LNK/ACT                             | Green | Blinking | Transmitting data  |
| Full Duplex                         | Amber | On       | Port works in full duplex mode                                   |
| 10/100/1000Base-T(X) (Combo) ports  |       |          |  |
| LNK/ACT                             | Green | On       | Ethernet links connected   |
| LNK/ACT                             | Green | Blinking | Transmitting data  |
| Full Duplex                         | Amber | On       | Port works in full duplex mode                                   |
| SFP Combo ports                     |       |          |  |
| LNK/ACT                             | Green | On       | Ethernet links connected   |
| LNK/ACT                             | Green | Blinking | Transmitting data  |

Follow the steps to set up the card:

1. Launch the Internet Explorer and type in IP address of the switch. The default static IP address is **192.168.10.1**



2. Log in with default user name and password (both are admin). After logging in, you should see the following screen. For more information on configurations, please refer to the user manual. For information on operating the switch using ORing's Open-Vision management utility, please go to ORing website.



### Resetting

To reboot the switch, press the **Reset** button for 2-3 seconds.

To restore the switch configurations back to the factory defaults, press the **Reset** button for 5 seconds.

## Specifications

| ORing Switch Model  | IES-P3073GC-LV | IES-P3073GC-HV |
|---|----------------|----------------|
| <b>Physical Ports</b>   |                |                |
| 10/100 Base-T(X) Ports in RJ45 Auto MDI/MDIX                              | 7              |                |
| Gigabit Combo Ports with 10/100/1000Base-T(X) and 100/1000Base-X SFP port | 3              |                |

| Technology                               |   |
|--|---|
| Ethernet Standards                       | IEEE 802.3 for 10Base-T, IEEE 802.3u for 100Base-TX and 100Base-FX, IEEE 802.3z for 1000Base-X, IEEE 802.3ab for 1000Base-T, IEEE 802.3x for Flow control, IEEE 802.3ad for LACP (Link Aggregation Control Protocol), IEEE 802.1D for STP (Spanning Tree Protocol), IEEE 802.1p for COS (Class of Service), IEEE 802.1Q for VLAN Tagging, IEEE 802.1w for RSTP (Rapid Spanning Tree Protocol), IEEE 802.1s for MSTP (Multiple Spanning Tree Protocol), IEEE 802.1x for Authentication, IEEE 802.1AB for LLDP (Link Layer Discovery Protocol)  |
| MAC Table                                | 8192 MAC addresses  |
| Priority Queues                          | 4   |
| Processing                               | Store-and-Forward   |
| Switch Properties                        | Switching latency: 7 us<br>Switching bandwidth: 7.4Gbps<br>Max. Number of Available VLANs: 4096<br>IGMP multicast groups: 1024<br>Port rate limiting: User Define   |
| Security Features                        | Enable/disable ports, MAC based port security<br>Port based network access control (802.1x)<br>VLAN (802.1Q) to segregate and secure network traffic<br>Supports Q-in-Q VLAN for performance & security to expand the VLAN space<br>Radius centralized password management<br>SNMP v1/v2c/v3 encrypted authentication and access security   |
| Software Features                        | STP/RSTP/MSTP (IEEE 802.1D/w/s)<br>Redundant Ring (O-Ring) with recovery time less than 10ms over 250 units<br>TOS/Diffserv supported<br>Quality of Service (802.1p) for real-time traffic<br>VLAN (802.1Q) with VLAN tagging and GVRP supported<br>IGMP Snooping for multicast filtering<br>Port configuration, status, statistics, monitoring, security<br>SNTP for synchronizing of clocks over network<br>Support PTP Client (Precision Time Protocol) clock synchronization<br>DHCP Server / Client support<br>Port Trunk support<br>MVR (Multicast VLAN Registration) support<br>Modbus TCP |
| Network Redundancy                       | O-Ring, Open-Ring, O-chain, MRP, STP / RSTP / MSTP  |
| Warning / Monitoring System              | Relay output for fault event alarming<br>Syslog server / client to record and view events<br>Include SMTP for event warning notification via email<br>Event selection support   |
| RS-232 Serial Console Port               | RS-232 in RJ45 connector with console cable. 9600bps, 8, N, 1   |
| <b>LED Indicators</b>                    |   |
| Power indicator                          | Green: Power LED x 3  |
| R.M. indicator                           | Green: Indicate system operated in O-Ring Master mode   |
| Fault indicator                          | Amber: Indicate unexpected event occurred   |
| 10/100Base-T(X) RJ45 port indicator      | Green for Link/Act. Amber for Duplex/Collision.   |
| 10/100/1000Base-T(X) RJ45 Port Indicator | Green for Link/Act. Amber for 100Mbps indicator.  |
| 100/1000Base-X Fiber Port Indicator      | Green for port Link/Act.  |
| <b>Fault contact</b>                     |   |
| Relay                                    | Relay output to carry capacity of 1A at 24VDC   |
| <b>Power</b>                             |   |
| Redundant Input power                    | Dual power inputs. 20~72 VDC dual 2-pin terminal block  |
| Power consumption (Typ.)                 | TBD   |
| Overload current protection              | Present   |
| Reverse polarity protection              | Present on terminal block   |
| <b>Physical Characteristic</b>           |   |
| Enclosure                                | IP-30   |
| Dimension (W x D x H)                    | 96.4 (W) x 145.5 (D) x 154 (H)mm (3.8 x 5.73 x 6.06inch)  |
| Weight (g)                               | TBD   |
|  | 1935g   |
| <b>Environmental</b>                     |   |
| Storage Temperature                      | -40 to 85°C (-40 to 185°F)  |
| Operating Temperature                    | -40 to 85°C (-40 to 185°F)  |
| Operating Humidity                       | 5% to 95% Non-condensing  |
| <b>Regulatory Approvals</b>              |   |
| Power Automation                         | IEC 61850-3, IEEE 1613  |
| EMI                                      | FCC Part 15, CISPR (EN55022) class A  |
| EMS                                      | EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), EN61000-4-8, EN61000-4-11  |
| Shock                                    | IEC60068-2-27   |
| Free Fall                                | IEC60068-2-32   |
| Vibration                                | IEC60068-2-6  |
| Safety                                   | EN60950-1   |
| Warranty                                 | 5 years   |