Description

The *Metasys*® Media Redundancy Protocol (MRP) ring-enabled IP controller solution provides an advanced networking topology alternative to Star and Daisy Chain topologies. You can use this solution to create a network of advanced Johnson Controls® IP controllers. To use the Ring Manager system, you must connect the IP controllers to an IE 2000 switch from Cisco Systems®.

Ring manager IP network system

You can use the items described in this catalog page to set up an IP network that contains a variety of components from a variety of manufacturers. There are many different ways to build a network. The items described here are a select subset of what is available, but are included for the following reasons:

- They can be used to build a complete network capable of supporting a large *Metasys* installation based on IP-enabled engines and controllers. The IP Network Wizard is a system design tool, and is provided to help you to select and configure components from this catalog page.

- They are industrial grade components that are suitable to deploy in building management system environments.

- They are interoperable with each other, with the vendor's full line of networking equipment, and with the equipment from all other large manufacturers.

- Johnson Controls' relationship with Cisco Systems enables access to a variety of technical solutions available worldwide.

- They improve network convergence time compared to rings managed using Rapid Spanning Tree Protocol.
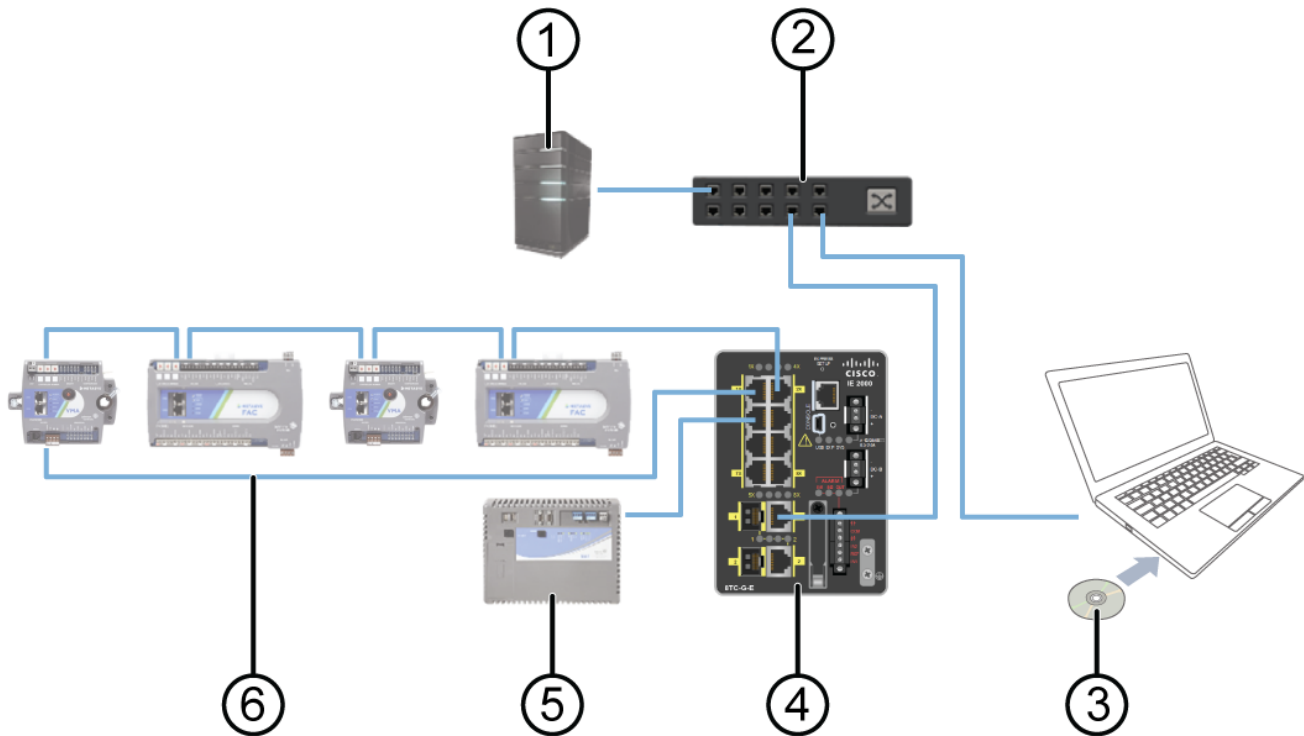
Ring network features and benefits

Metasys Release 10.0 adds support for MRP-enabled Ring Topology on IP controllers. The benefits of a ring topology include the following:

- Lower cabling costs compared to a home run (star) network topology.

- Reduced number of network switch ports required compared to a home run (star) network topology.

- Improved network availability of controllers compared to daisy chain network topology.

- Improved network convergence time compared to rings managed using Rapid Spanning Tree Protocol.

Network component overview

There are many ways to connect IP-enabled controllers to the IE 2000 switch, because the IE 2000 is a fully-featured, managed switch. The following figure demonstrates one possible ring combination, and identifies the network components that you may require. Use this catalog to identify ordering information for the items labeled as 2 and 4 in the following figure. For ordering of the other items, please refer to the respective IP Controller, Engine, or Server catalog pages.

Figure 1: Example network components

Label	Description
1	ADS/ADX server
2	Aggregation Switch If this functionality is not provided by an IT department, the system design tool guides you toward selection of either the Cisco IE 4010 or Cisco IE 2000. See Table 3 for the list of components required to install one of the Cisco IE switches as an aggregation switch.
3	Industrial Network Director (IND) software Use the IND software to configure IE 2000 and IE 4010 switches without the use of SD cards. Available only from an authorized Cisco distributor.
4	Access switch If this functionality is not provided by an IT department, the design tool guides you to select an appropriate Cisco IE 2000 switch. Two models are available for you to purchase through Johnson Controls, one with 8 Ethernet ports for network access, the other with 16 ports. For the list of components related to the 8-port IE 2000, see Table 1. For information on the 16-port version, see Table 2.
5	Network engine supervisory device For more information, refer to the *Network Engines Product Bulletin (LIT-120123138)*.
6	IP field controllers arranged in a ring network For more information on IP field controllers refer to the *Advanced Application Field Equipment Controller (FAC) Catalog Page (LIT-1900759)* and the *VMA Programmable VAV Box Controllers Catalog Page (LIT-1900764)*.

Selection charts

The part numbers listed in this section have been identified as the Cisco Systems kits that may be required for a ring manager enabled network based on specific network design and needs. For best practice, use the *Metasys* IP Network Wizard Tool to generate an estimated list of basic equipment.

ⓘ **Note:** The parts listed in Table 1 make up a minimum ring manager configuration. You can add or select additional items in subsequent tables as alternative options if needed.

Table 1: Typical Cisco Systems part numbers for basic ring manager configuration

Product code number		Description
US	**Canada**	
IE-2000-8TC-G-E	C-IE20008TC-G-E	**8-port managed network switch** • Industrial-grade Ethernet switch • Fully managed, Layer 2/Layer 3 switch • 8 Fast Ethernet ports (10/100 Mbit/sec) for network access • 2 Gigabit Ethernet ports (1000 Mbit/sec) for uplink, optionally upgradeable to optical fiber • SD card slot and console port provide two options for switch configuration • Supports a wide range of security options, including access control lists (ACLs) • Supports MRP for redundant connectivity • Supports Rapid Spanning Tree Protocol (RSTP) for redundant connectivity • Cisco Part Number: IE-2000-8TC-G-E • Cisco Description: IE 8 10/100,2 T/SFP, Base with 1588
11084443	C-11084443	**AC Power Module with IEC Plug and Right Angle Power Cord, 110 V** This is the power supply for the switch. It is designed for operation in all regions of the world. The power cord is for the region of the world that includes the United States and Canada. ⓘ **Note:** Additional wiring is needed to connect the power supply to the switch. Both the power supply and switch come with appropriate connectors, but you need to supply wire and prepare cabling in the field. • Cisco Part Numbers: PWR-IE50W-AC-IEC=; CAB-AC-RA • Cisco Descriptions: AC Power Module w/ IEC Plug; Power Cord, 110V, Right Angle

Table 1: Typical Cisco Systems part numbers for basic ring manager configuration

Product code number		Description
US	**Canada**	
SD-IE-1GB	C-SD-IE-1GB	**IE 1GB SD Memory Card for IE 2000, IE 4010** Use this SD card to provision the switch with the configuration file and operating system. If you use Cisco's Industrial Network Director (IND) to commission the switch, you do not require an SD card. • Cisco Part Number: SD-IE-1GB • Cisco Description: IE 1GB SD Memory Card for IE 2000, IE 4010
CAB-CONSOLE-USB	C-CABCONSOLEUSB	**Console Cable 6 ft. with USB Type A and mini-B** Optional cable used to connect to the IE 2000 switch console for local administration. To run a console session from the command-line interface, you also need to download a driver from Cisco. It is useful to have one cable per site for troubleshooting. • Cisco Part Number: CAB-CONSOLE-USB • Cisco Description: Console Cable 6 ft. with USB Type A and mini-B
12584931	C-12584931	**Cisco MRP Multi Domain MRP Manager** This license makes it possible to run up to three MRP rings on a single IE 2000 switch. The license is purchased once and lasts for the lifetime of the switch. • Cisco Part Number: LIC-MRP-MULTI-MGR= • Cisco Description: Cisco MRP Multi Domain Manager Functionality
11165103	C-11165103	**SMARTnet support contract with a one-year term for IE-2000-8TC-G-E** Renewable SMARTnet contract enables Cisco Technical Assistance Center (TAC) support. This covers everything from phone support to equipment replacement. Each contract is tied to a specific switch based on the switch's serial number. • Cisco Part Number: CON-SNT-IE20008E • Cisco Description: SNTC-8X5XNBD IE 8 10/100,2 T/SFP ➤ **Important:** When you order a Cisco SMARTnet license, you must provide a contact name, email address and telephone number as part of the customer registration.

You can add the parts listed in the following table to a minimum ring manager configuration, or select them as alternative options. If you require a larger capacity switch, you can substitute items IE-2000-8TC-G-E and 11165103 in Table 1 with the parts listed in the first two rows of Table 2.

Table 2: Optional: IE 2000 components

| Product code number | | Description |
US	Canada	
10961384	C-10961384	**16-port managed network switch** This is the same as the IE-2000-8TC-G-E, except that has 16 ports for network access. ⓘ **Note:** If you substitute the IE-2000-8TC-G-E hardware, you must also substitute the support contract. See entry for code number 10975736. • Cisco Part Number: IE-2000-16TC-G-E • Cisco Description: IE 16 10/100,2 FE SFP+2 T/SFP, Base with 1588
10975736	C-10975736	**SMARTnet support contract with a one-year term for IE-2000-16TC-G-E** Renewable SMARTnet contract enables Cisco TAC support. This covers everything from phone support to equipment replacement. Each contract is tied to a specific switch based on the switch's serial number. • Cisco Part Number: CON-SNT-IE20001E • Cisco Description: SNTC-8X5XNBD IE 16 10/100,2 FE SF ❱ **Important:** When you order a Cisco SMARTnet license, you must provide a contact name, email address and telephone number as part of the customer registration.
GLC-LX-SM-RGD=	C-GLC-LXSM-RGD=	**1000Mbps Single Mode Rugged SFP** Single form-factor pluggable module for interfacing with fiber optic cable. Use this item to adapt the IE 2000 bundle for use with optical fiber. Works with both single-mode and multi-mode fiber. Provides extended reach of more than the 100 meters that is standard for Ethernet; the actual reach depends on the type of optical fiber used. ⓘ **Note:** Two SFPs are needed per optical fiber. • Cisco Part Number: GLC-LX-SM-RGD= • Cisco Description: 1000Mbps Single Mode Rugged SFP

If an IE 4010 aggregation switch is required by customer design for either aggregation or additional connection ports, order the parts listed in Table 3. The IE 2000 ring manager switches typically connect up through an aggregation switch such as the IE 4010 or equivalent. If the network requirements permit the substitution of an IE 4010 aggregation switch with an IE 2000 configured as an aggregation switch, then you can order the parts listed in Table 4.

ⓘ   **Note:** You cannot use the IE 2000 4-port switch for MRP.

Table 3: Optional: IE 4010 aggregation switch components

Product code number		Description
US	Canada	
IE-4010-4S24P	C-IE-4010-4S24P	**IE 4010 network switch for aggregation** This switch is recommended as an aggregation switch for large networks. The purpose of an aggregation switch is to interconnect the access switches. • Cisco Part Number: IE-4010-4S24P • Cisco Description: IE 4010 4x 1G SFP, 24 10/100/1000 GE PoE LAN Base
12237614	C-12237614	**SMARTnet support contract with a one-year term for IE 4010 switch** ⓘ **Note:** Use this item with an IE 4010 aggregation switch. SMARTnet support contract with a one-year term Renewable SMARTnet contract enables Cisco TAC support. This covers everything from phone support to equipment replacement. Each contract is tied to a specific switch based on the switch's serial number. • Cisco Part Number: CON-SNT-IE40104S • Cisco Description: SNTC-8X5XNBD IE 4010 4x 1G SFP, 24 ❯ **Important:** When you order a Cisco SMARTnet license, you must provide a contact name, email address and telephone number as part of the customer registration.
PWR-RGD-AC-DC-H	C-PWR-RGDACDC-H	**Power supply for IE 4010 network switch** ⓘ **Note:** Use this item with an IE 4010 aggregation switch. Power Supply for the IE 4010 Switch. • Cisco Part Number: PWR-RGD-AC-DC-H • Cisco Description: IE 4010/5000 Hazloc Pwr Supply High AC/DC 85-264VAC/88-300VDC ⓘ **Note:** The power supply has screw terminals for connecting a power cord. A power cord is not included and must be obtained separately.
SD-IE-1GB	C-SD-IE-1GB	**IE 1GB SD Memory Card for IE 2000, IE 4010** Use this SD card to provision the switch with the configuration file and operating system. If you use Cisco's Industrial Network Director (IND) to commission the switch, you do not require an SD card. • Cisco Part Number: SD-IE-1GB • Cisco Description: IE 1GB SD Memory Card for IE 2000, IE 4010

Table 4: Optional: IE 2000 4-port aggregation switch components

Product code number		Description
US	**Canada**	
IE-2000-4T-G-B	C-IE-20004T-G-B	**4-Port managed network switch** ➤ **Important:** This product is **not** available as a ring manager switch • Industrial-grade Ethernet switch • Fully managed, Layer 2/Layer 3 switch • 4 Fast Ethernet ports (10/100 Mbit/sec) • 2 Gigabit Ethernet ports (1000 Mbit/sec) for uplink • SD card slot and console port provide two options for switch configuration • Supports a wide range of security options, including ACLs • Support RSTP for redundant connectivity • Uses common IE 2000 power supply and North American power cord: PWR-IE50W-AC-IEC=, CAB-AC-RA • Cisco Part Number: IE-2000-4T-G-B • Cisco Description: IE 4 10/100, 2 Gig port, Base
10878669	C-10878669	**SMARTnet support contract with a one-year term for IE-2000-4T-G-B** ⓘ **Note:** Use this item with an IE 2000 aggregation switch. Renewable SMARTnet contract enables Cisco TAC support. This covers everything from phone support to equipment replacement. Each contract is tied to a specific switch based on the switch's serial number. • Cisco Part Number: CON-SNT-IE2K4TGB • Cisco Description: SOLN SUPP 8X5XNBD IE 4 10/100,2 Gig port, Base ➤ **Important:** When you order a Cisco SMARTnet license, you must provide a contact name, email address and telephone number as part of the customer registration.

Table 4: Optional: IE 2000 4-port aggregation switch components

Product code number		Description
US	**Canada**	
11084443	C-11084443	**AC Power Module with IEC Plug and Power Cord, 110V, Right Angle** ⓘ **Note:** Use this item with an IE 2000 aggregation switch. This is the power supply for the switch. It is designed for operation in all regions of the world. The power cord is for the region of the world that includes the United States and Canada. ⓘ **Note:** Additional wiring is needed to connect the power supply to the switch. Both the power supply and switch come with appropriate connectors, but you need to supply wire and prepare cabling in the field. • Cisco Part Numbers: PWR-IE50W-AC-IEC=; CAB-AC-RA • Cisco Descriptions: AC Power Module w/ IEC Plug; Power Cord, 110V, Right Angle
SD-IE-1GB	C-SD-IE-1GB	**IE 1GB SD Memory Card for IE 2000, IE 4010** Use this SD card to provision the switch with the configuration file and operating system. If you use Cisco's Industrial Network Director (IND) to commission the switch, you do not require an SD card. • Cisco Part Number: SD-IE-1GB • Cisco Description: IE 1GB SD Memory Card for IE 2000, IE 4010

Ordering for markets outside North America

If you are outside of the United States or Canada, you cannot use the Johnson Controls product codes listed in the tables in the Selection charts section to order Cisco hardware. Cisco global distribution enables common Cisco part numbers to be used to support their local in-country authorized hardware distribution requirements. Cisco part numbers are included in the Selection charts section to enable consistent part ordering outside North America.
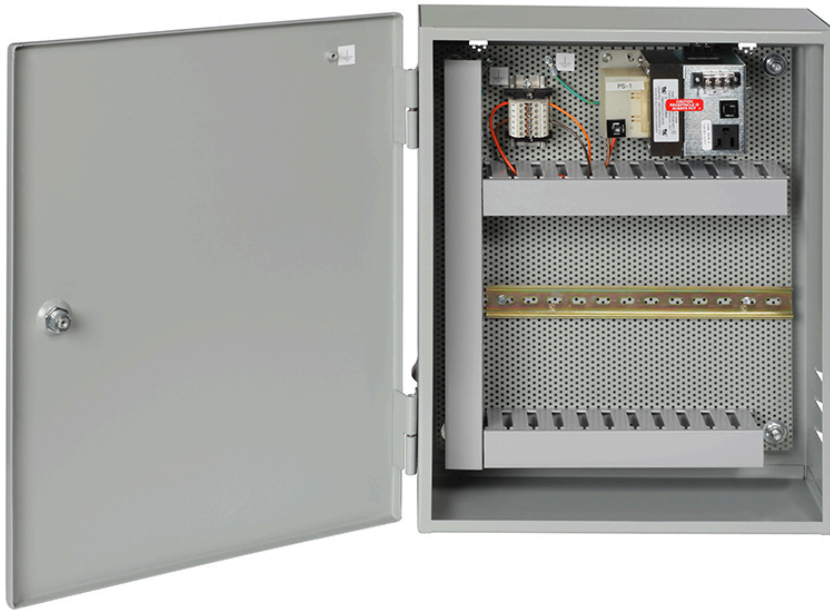
Panel installation

You may need to use a protective enclosure or panel when you install a Cisco IE 2000 switch. Table 5 lists panel options that have been reviewed and tested by Johnson Controls. These panels are suitable for mounting IE 2000 managed network switches and associated IE 2000 switch DC power supplies. Use only the products listed in Table 5 with the Cisco IE 2000 switch.

ⓘ **Note:** Purchase of a panel does not include a Ring Manager, Ring Manager power supply, network engine, or IP field controller. Purchase these products separately and install them on site.

Figure 2: Example panel - indicative only

For instructions on mounting network switches and DC power supplies in a panel, refer to the *Cisco IE 2000 and IE 4010 Ethernet Switches for BAS Networks Installation Instructions and Troubleshooting Guide (LIT-12013055)*.

Table 5: Panels compatible with Ring Manager devices

Code number	Description (measurements are height x width x depth)
P2BBN-00001N00	NEMA 1 enclosure, 20 in. x 24 in. x 9.25 in. (51 cm x 61 cm x 24 cm), with perforated sub-panel, 120/24 VAC Power Supply, wire duct, 5 point distribution block Suitable only for use with SNE-x engines or IP field controllers
P2DBN-00001N00	NEMA 1 enclosure, 24 in. x 36 in. x 9.25 in. (61 cm x 92 cm x 24 cm), with perforated sub-panel, 120/24 VAC Power Supply, wire duct, 5 point distribution block Suitable for use with NAE-x and SNE-x engines and IP controllers
P2DBN-00002N00	NEMA 1 enclosure, 24 in. x 36 in. x 9.25 in. (61 cm x 92 cm x 24 cm), with perforated sub-panel, 120/24 VAC Power Supply, additional 96 VA transformer, wire duct, 10 point distribution block Suitable for use with NAE-x and SNE-x engines and IP controllers

Technical support and repair information

The Ring Manager Solution is made up of components from Johnson Controls and Cisco. If technical or hardware problems occur, contact the nearest Johnson Controls representative, or contact the Johnson Controls Field Support Center. The details of the question or issue determines whether the Cisco Technical Assistance Center (TAC) needs to be contacted and brought into the discussions.

ⓘ **Note:** After the initial year of support as provided by the associated part numbers included in this catalog page, Cisco Smartnet support licenses are available from authorized Cisco distributors in multiple year increments and multiple levels of support.

Specifications

Refer to Cisco specification documents for additional hardware specific information, available from the *Support and Downloads* page of the Cisco website (https://www.cisco.com/c/en/us/support/index.html).