

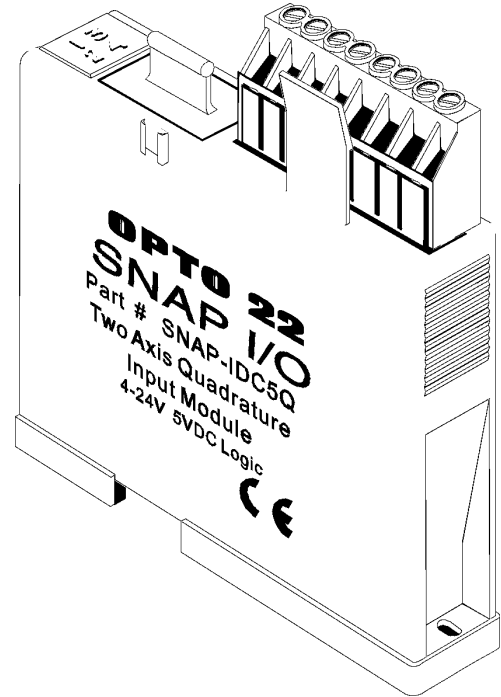
| Part Number | Description                             |
|-------------|---|
| SNAP-IDC5Q  | SNAP Two-Axis Quadrature Position Input |

### Description

The SNAP-IDC5Q quadrature input module is designed to allow a SNAP I/O unit to resolve **two** axes of rotating position information from quadrature encoder devices. The module outputs a pulse to the I/O unit upon each change in quadrature state. The I/O unit counts the module output pulses and keeps track of the direction and position.

The SNAP-IDC5Q can be used in the first eight positions (0 through 7) of most SNAP B-series racks and can also be installed in all SNAP direct (D-series) racks. It is compatible with Ethernet-based SNAP-B3000-ENET and SNAP-UP1-ADS brains; the SNAP-IDC5Q can also work with B100, B3000, or B3000-HA brains, which use the industry-standard Mistec protocol.

The SNAP-IDC5Q can be used with most quadrature devices, including transducers with TTL, CMOS, and open collector outputs. All inputs are isolated from each other and do not share any common connections.



### Specifications

|   |   |
|---|---|
| Logic Voltage                           | 5 VDC   |
| Operating Ambient Temperature           | 0 to 70° C  |
| Isolation input-to-output               | 4,000 V <sub>rms</sub>  |
| Input Voltage Range                     | 4–24 VDC  |
| Input Resistance                        | 1K ohms @ 4 V<br>560 ohms @ 24 V  |
| Input Allowed for No Output             | 1 V   |
| Logic Supply Current @ 5 VDC            | 120 mA  |
| Maximum Input Frequency, 50% Duty Cycle | 4 kHz SNAP Ultimate and SNAP Ethernet brains;<br>5 kHz other SNAP brains* |
| Maximum Reverse Input Voltage           | -21 V   |

\* The module actually supports an input frequency of up to 20 kHz (for SNAP Ultimate and SNAP Ethernet brains) or 25 kHz (for other brains), but outputs a frequency four times the input frequency. Due to these limits of the Opto 22 brains, the maximum frequency to the module is 4kHz and 5kHz, as shown.

### Features

- 4,000 V<sub>rms</sub> optical isolation
- Built-in LED status indicators
- 4 times encoder resolution
- Input signals in 4–24 VDC range
- Installs on SNAP D-series I/O mounting racks with a B100 brain board; also installs on most B-series racks with a B3000 or B3000-HA brain, or with a SNAP Ethernet or SNAP Ultimate brain that has analog capability.

### Module Operation

The SNAP-IDC5Q quadrature module converts a quadrature signal to a stream of pulses that is sent to the brain on one of two input channels. The rotation direction of the encoder determines which output is used. One 0.8 microsecond pulse is output for each change of quadrature state. The actual resolution of the position count is four times the encoder resolution (4xPPR).

The position count is incremented when the signal into the A channel leads the signal into the B channel. It is decremented when the signal into the B channel leads the signal into the A channel.

Since the brain has a maximum input count rate, the maximum allowable RPM at which the encoder may turn is related to the number of cycles per turn that the encoder outputs.

#### Using the SNAP-IDC5Q with SNAP Ethernet and SNAP Ultimate Brains

Since the maximum input frequency of these brains is 10 kHz, the maximum frequency of the module when using SNAP Ethernet or SNAP Ultimate brains is 2.5 kHz. To determine maximum RPM, use the following chart or the equation:

$$\text{Maximum Encoder RPM} = \frac{150,000}{\text{Encoder Pulses per Revolution}}$$

| SNAP Ethernet and Ultimate Brains |             |
|-----------------------------------|-------------|
| Encoder PPR                       | Maximum RPM |
| 1                                 | 150,000     |
| 10                                | 15,000      |
| 12                                | 12,500      |
| 60                                | 2500        |
| 100                               | 1500        |
| 120                               | 1250        |
| 200                               | 750         |
| 240                               | 625         |
| 256                               | 586         |
| 300                               | 500         |
| 360                               | 417         |
| 400                               | 375         |
| 500                               | 300         |
| 600                               | 250         |
| 720                               | 208         |
| 900                               | 167         |
| 1000                              | 150         |
| 1024                              | 146         |
| 2000                              | 75          |

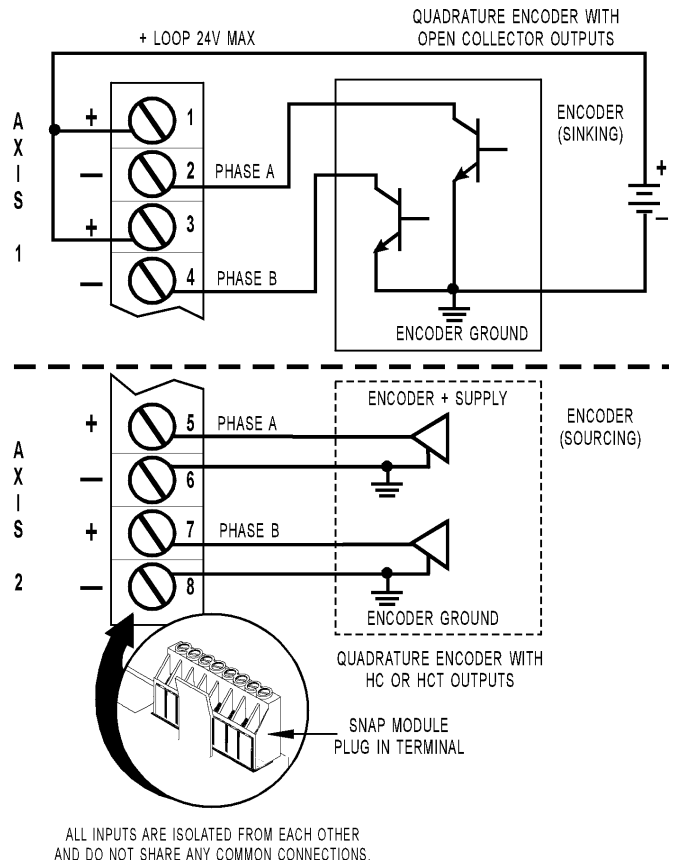
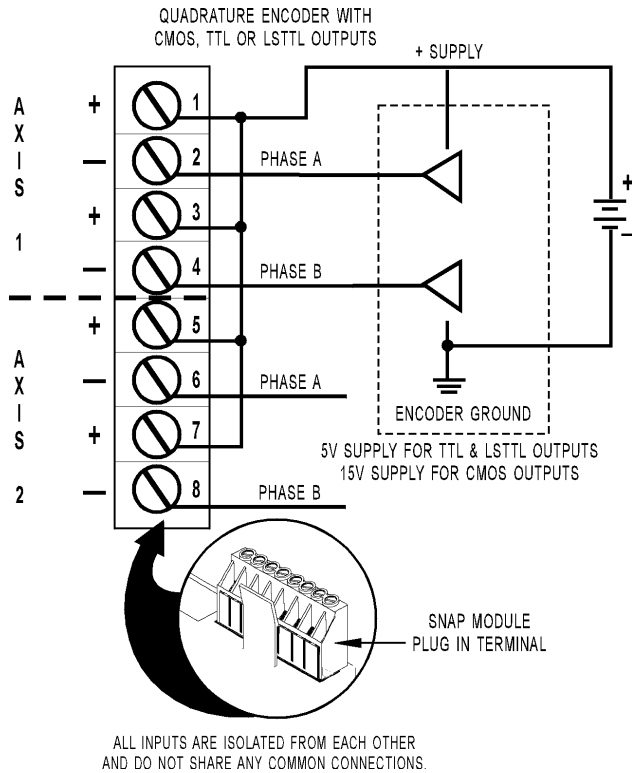
#### Using the SNAP-IDC5Q with B100, B3000, and B3000-HA Brains

Since the maximum input frequency of these brains is 20 kHz, the maximum frequency of the module when using B100, B3000, and B3000-HA brains is 5 kHz. To determine maximum RPM, use the following chart or the equation:

$$\text{Maximum Encoder RPM} = \frac{300,000}{\text{Encoder Pulses per Revolution}}$$

| B100, B3000 and B3000-HA Brains |             |
|---------------------------------|-------------|
| Encoder PPR                     | Maximum RPM |
| 1                               | 300,000     |
| 10                              | 30,000      |
| 12                              | 25,000      |
| 60                              | 5000        |
| 100                             | 3000        |
| 120                             | 2500        |
| 200                             | 1500        |
| 240                             | 1250        |
| 256                             | 1172        |
| 300                             | 1000        |
| 360                             | 833         |
| 400                             | 750         |
| 500                             | 600         |
| 600                             | 500         |
| 720                             | 417         |
| 900                             | 333         |
| 1000                            | 300         |
| 1024                            | 293         |
| 2000                            | 150         |

### Connection Diagrams



### Products

Opto 22 produces a broad array of reliable, flexible hardware and software products for industrial automation, remote monitoring, enterprise data acquisition, and machine-to-machine (M2M) applications.

### SNAP Ethernet Systems

Based on the Internet Protocol (IP), SNAP Ethernet systems offer flexibility in their network connectivity and in the software applications they work with. The physical network may be a wired Ethernet network, a cellular wireless network, or a modem. A wide variety of software applications can exchange data with SNAP Ethernet systems, including:

- Opto 22's own ioProject™ suite of control and HMI software
- Manufacturing resource planning (MRP), enterprise management, and other enterprise systems
- Human-machine interfaces (HMIs)
- Databases
- Email systems
- OPC client software
- Custom applications
- Modbus/TCP software and hardware.



SNAP Ethernet system hardware consists of controllers and I/O units. Controllers provide central control and data distribution. I/O units provide local connection to sensors and equipment.

### SNAP OEM Systems

Opto 22 SNAP OEM I/O systems are highly configurable, programmable processors intended for OEMs, IT professionals, and others who need to use custom software with Opto 22 SNAP I/O modules.

Linux® applications running on these systems can read and write to analog, simple digital, and serial I/O points on SNAP I/O modules using easily implemented file-based operations. Applications can be developed using several common development tools and environments, including C or C++, Java, and shell scripts.



### M2M Systems

Machine-to-machine (M2M) systems connect your business computer systems to the machines, devices, and environments you want to monitor, control, or collect data from. M2M systems often use wireless cellular communications to link remote facilities to central systems over the Internet, or to provide monitoring and control capability via a cellular phone.

Opto 22's Nvivo™ systems include everything you need for M2M—interface and communications hardware, data service plan, and Web portal—in one easy-to-use package. Visit [nvio.opto22.com](http://nvio.opto22.com) for more information.

### Opto 22 Software

Opto 22's ioProject and FactoryFloor® software suites provide full-featured and cost-effective control, HMI, and OPC software to power your Opto 22 hardware. These software applications help you develop control automation solutions, build easy-to-use operator interfaces, and expand your manufacturing systems' connectivity.



### Quality

In delivering hardware and software solutions for worldwide device management and control, Opto 22 retains the highest commitment to quality. We do no statistical testing; each product is made in the U.S.A. and is tested twice before leaving our 160,000 square-foot manufacturing facility in Temecula, California. That's why we can guarantee solid-state relays and optically-isolated I/O modules *for life*.

### Product Support

Opto 22's Product Support Group offers comprehensive technical support for Opto 22 products. The staff of support engineers represents years of training and experience, and can assist with a variety of project implementation questions. Product support is available in English and Spanish from Monday through Friday, 7 a.m. to 5 p.m. PST.

### Opto 22 Web Sites

- [www.opto22.com](http://www.opto22.com)
- [nvio.opto22.com](http://nvio.opto22.com)
- [www.internetio.com](http://www.internetio.com) (live Internet I/O demo)

### Other Resources

- OptoInfo CDs
- Custom integration and development
- Hands-on customer training classes.



### About Opto 22

Opto 22 manufactures and develops hardware and software products for industrial automation, remote monitoring, enterprise data acquisition, and machine-to-machine (M2M) applications. Using standard, commercially available Internet, networking, and computer technologies, Opto 22's input/output and control systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, and electronic assets that are key to their business operations. Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel.

Founded in 1974 and with over 85 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability.