

# Flat Pak I/O Modules

## Features

- Industry-standard plug-in modules
- 4000 VAC optical isolation
- Input modules handle both AC and DC inputs
- AC output module has zero voltage turn-on, zero current turn-off
- UL and CSA recognized; RoHS lead-free; CE low voltage and EMC

## Description

Flat Pak I/O modules include AC and DC input and output modules. All are industry-standard, plug-in modules with 4000 volts of optical isolation between the field side and the logic side, and all are recognized by UL and CSA.

Because of their low profile, Flat Pak modules are ideal for user-designed printed circuit boards where the standard single-channel or Quad Pak modules do not provide an exact fit.

## AC/DC Input Modules

Flat Pak input modules handle either alternating current (AC) or direct current (DC). These modules are used for sensing ON/OFF voltage levels. All Flat Pak input modules are designed with filtering on the input and a hysteresis amplifier for high noise rejection and transient free “clean” switching. Each module provides up to 4000 V of optical isolation between field inputs and the logic side of the circuit.

Typical uses and applications include sensing the presence or absence of voltage from sources such as:

- Proximity switches
- Limit switches
- Selector switches
- Push-button and toggle switches
- Thermostats
- Photoelectric switches
- TTL-compatible devices



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## AC Output Module

The OAC5P Flat Pak output module is used for controlling or switching AC loads. It is equivalent to a single-pole, single-throw, normally open contact (FORM A, SPST-NO, Make). The OAC5P features zero voltage turn-on and zero current turn-off.

Typical uses and applications for the OAC5P include switching the following loads:

- Relays
- Solenoids and contactors
- Motor starters
- Heaters
- Lamps or indicators

## DC Output Module

The ODC5P Flat Pak output module is used for controlling or switching DC loads. Typical uses and applications for the ODC5P include switching the following loads:

- DC relays
- DC solenoids
- DC motor starters
- DC lamps or indicators

## Part Numbers

Part	Description
IAC5P	Flat Pak input module, 90–140 VAC/VDC
IDC5P	Flat Pak input module, 10–32 VDC or 12–32 VAC
OAC5P	Flat Pak output module, 12–140 VAC
ODC5P	Flat Pak output module, 5–60 VDC

## Specifications—AC/DC Input Modules

	IAC5P	IDC5P
Input Voltage Range	90–140 VAC or VDC	10–32 VDC or 12–32 VAC
Input Current at Maximum Line	11 mA	25 mA
Turn-on Time	20 ms	5 ms
Turn-off Time	20 ms	5 ms
Input Allowed for No Output	3 mA, 45 V	1 mA, 3 V
Logic Supply Voltage, Nominal	5 VDC	5 VDC
Logic Supply Voltage Range	4.5–6.0 VDC	4.5–6.0 VDC
Logic Supply Current at Nominal Logic Voltage	12 mA	12 mA
Input Resistance (R1 in Schematic Diagram)	14,000 Ohms	1500 Ohms
Control Resistance (Rc in Schematic Diagram)	220 Ohms	220 Ohms
Optical Isolation, Input-to-output	4000 Vrms	4000 Vrms
Output Voltage Drop	0.4 V @ 50 mA	0.4 V @ 50 mA
Output Current	50 mA	50 mA
Output Leakage with No Input	100 $\mu$ A maximum @ 30 VDC	100 $\mu$ A maximum @ 30 VDC
Operating Temperature	–30 to 70 °C	–30 to 70 °C
Agency Approvals	UL (E58169), CSA (35852), RoHS, CE	UL (E58169), CSA (35852), RoHS, CE
Warranty	Lifetime	Lifetime

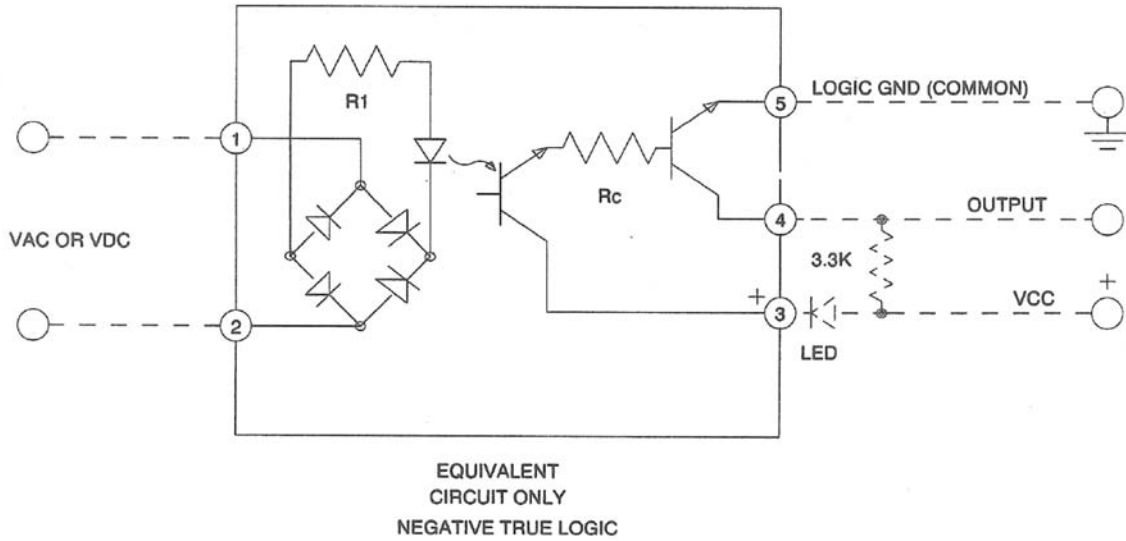
# Flat Pak I/O Modules

## Specifications—AC and DC Output Modules

	OAC5P	ODC5P
Operating Voltage Range	12–140 VAC	5–60 VDC
Line Voltage, Nominal	120 VAC	n/a
Current Rating	3 A @ 45 °C ambient 2 A @ 70 °C ambient	3 A @ 45 °C ambient 2 A @ 70 °C ambient
Off-state Leakage at Maximum Voltage	5 mA, rms	1 mA
Logic Voltage, Nominal	5 VDC	5 VDC
Logic Voltage Range (Vcc)	2.5–8 VDC	2.5–8 VDC
Logic Pickup Voltage	2.55 VDC	2.5 VDC
Logic Dropout Voltage	1 VDC	1 VDC
Logic Input Current at Normal Logic Voltage (I <sub>out</sub> in Schematic Diagram)	12 mA	12 mA
Control Resistance (R <sub>c</sub> in Schematic Diagram)	220 Ohms	220 Ohms
One-second Surge	n/a	5 A
One-cycle Surge	80 A peak	n/a
Peak Repetitive Voltage	500 V	n/a
Minimum Load Current	20 mA	n/a
Operating Frequency	25–65 Hz	n/a
Turn-on Time	1/2 cycle maximum, zero voltage	100 microseconds
Turn-off Time	1/2 cycle maximum, zero current	750 microseconds
DV/DT, Off-state	200 V/microsecond	n/a
DV/DT, Commutating	Snubbed for rated 0.5 power factor load	n/a
Output Voltage Drop Maximum Peak	1.6 V	1.6 V
Operating Temperature	–30 to 70 °C	–30 to 70 °C
Agency Approvals	UL (E58169), CSA (35852)	UL (E58169), CSA (35852)
Warranty	Lifetime	Lifetime

## Schematic—Input Modules

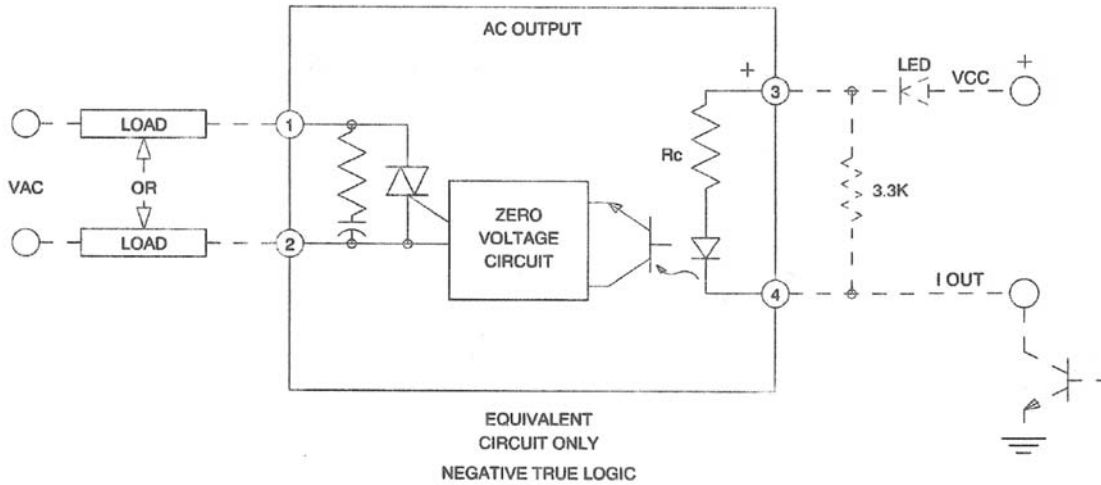
AC/DC Inputs (IAC5P and IDC5P)



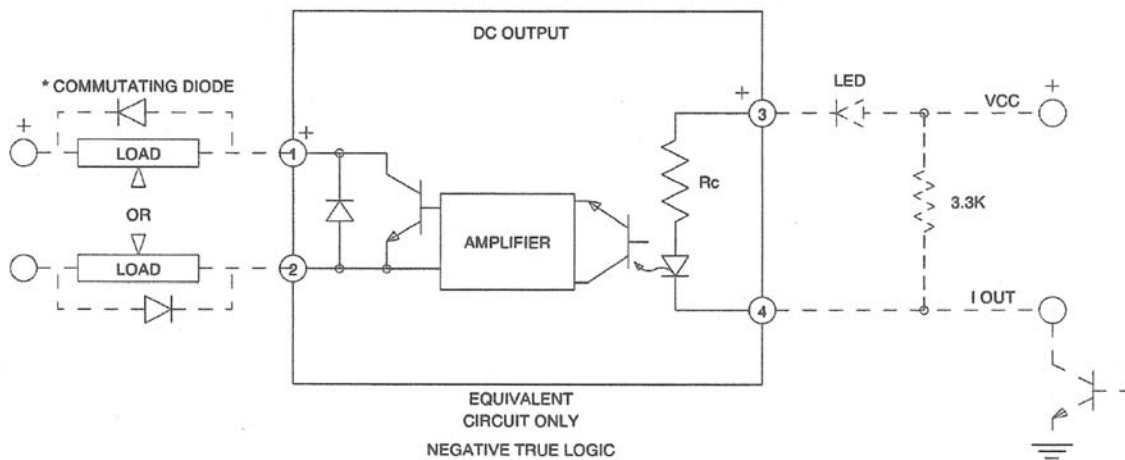
# Flat Pak I/O Modules

## Schematics—Output Modules

### AC Output (OAC5P)



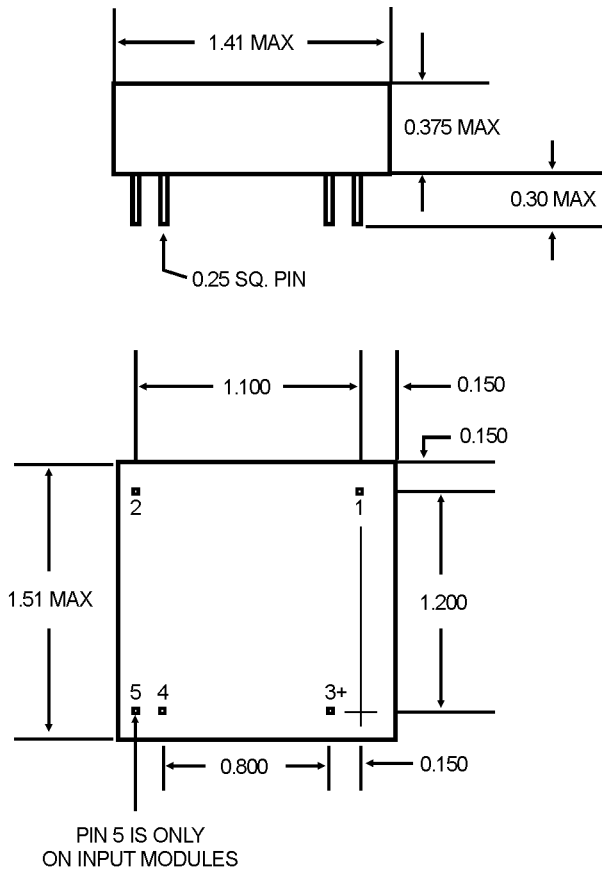
### DC Output (ODC5P)



\* Must be used on inductive loads.

Note: Also compatible with Totem Pole or 3-State Output.

## Dimensional Drawing—All Flat Pak Modules



# More About Opto 22

## Products

Opto 22 develops and manufactures reliable, flexible, easy-to-use hardware and software products for industrial automation, remote monitoring, and data acquisition applications.

### SNAP PAC System

Designed to simplify the typically complex process of understanding, selecting, buying, and applying an automation system, the SNAP PAC System consists of four integrated components:

- SNAP PAC controllers
- PAC Project™ Software Suite
- SNAP PAC brains
- SNAP I/O™

### SNAP PAC Controllers

Programmable automation controllers (PACs) are multifunctional, multidomain, modular controllers based on open standards and providing an integrated development environment.

Opto 22 has been manufacturing PACs for many years. The latest models include the standalone SNAP PAC S-series and the rack-mounted SNAP PAC R-series. Both handle a wide range of digital, analog, and serial functions and are equally suited to data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

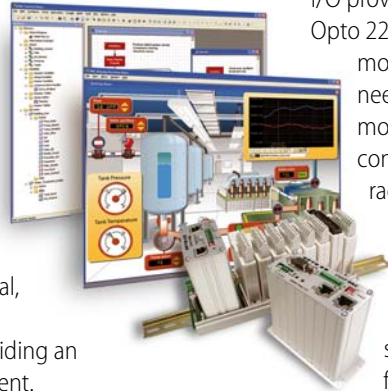
SNAP PACs are based on open Ethernet and Internet Protocol (IP) standards, so you can build or extend a system without the expense and limitations of proprietary networks and protocols.

### PAC Project Software Suite

Opto 22's PAC Project Software Suite provides full-featured and cost-effective control programming, HMI (human machine interface) development and runtime, OPC server, and database connectivity software to power your SNAP PAC System.

These fully integrated software applications share a single tagname database, so the data points you configure in PAC Control™ are immediately available for use in PAC Display™, OptoOPCServer™, and OptoDataLink™. Commands are in plain English; variables and I/O point names are fully descriptive.

PAC Project Basic offers control and HMI tools and is free for download on our website, [www.opto22.com](http://www.opto22.com). PAC Project Professional, available for separate purchase, adds OptoOPCServer, OptoDataLink, options for Ethernet link redundancy or segmented networking, and support for legacy Opto 22 serial *mistic*™ I/O units.



### SNAP PAC Brains

While SNAP PAC controllers provide central control and data distribution, SNAP PAC brains provide distributed intelligence for I/O processing and communications. Brains offer analog, digital, and serial functions, including thermocouple linearization; PID loop control; and optional high-speed digital counting (up to 20 kHz), quadrature counting, TPO, and pulse generation and measurement.

### SNAP I/O

I/O provides the local connection to sensors and equipment. Opto 22 SNAP I/O offers 1 to 32 points of reliable I/O per module, depending on the type of module and your needs. Analog, digital, serial, and special-purpose modules are all mixed on the same mounting rack and controlled by the same processor (SNAP PAC brain or rack-mounted controller).

## Quality

Founded in 1974 and with over 85 million devices sold, Opto 22 has established a worldwide reputation for high-quality products. All are made in the U.S.A. at our manufacturing facility in Temecula, California. Because we do no statistical testing and each part is tested twice before leaving our factory, we can guarantee most solid-state relays and optically isolated I/O modules for life.

## Free Product Support

Opto 22's Product Support Group offers free, comprehensive technical support for Opto 22 products. Our staff of support engineers represents decades of training and experience. Product support is available in English and Spanish, by phone or email, Monday through Friday, 7 a.m. to 5 p.m. PST.

## Free Customer Training

Hands-on training classes for the SNAP PAC System are offered at our headquarters in Temecula, California. Each student has his or her own learning station; classes are limited to nine students. Registration for the free training class is on a first-come, first-served basis. See our website, [www.opto22.com](http://www.opto22.com), for more information or email [training@opto22.com](mailto:training@opto22.com).

## Purchasing Opto 22 Products

Opto 22 products are sold directly and through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-6786 or 951-695-3000, or visit our website at [www.opto22.com](http://www.opto22.com).

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