G4 DIGITAL DC INPUT MODULES

Features

> 4000 volts transient optical isolation
> Built-in LED status indicator
> Small footprint design, reducing mounting space by approximately 50 percent
> Built-in filtering for transient suppression and noise rejection
> Operating temperature: -30 °C to 70 °C
> UL recognized, CSA certified, CE approved
> Passes NEMA Showering Arc Test (ICS 2-230)
> Meets IEEE Surge Withstand Specification (IEEE-472)

Opto 22 G4 digital input modules include the G4IDC5B high-speed module and the G4IDC5MA module with manual-on/manual-off/automatic switch for diagnostic testing.

DESCRIPTION

Opto 22's G4 DC input modules are used to detect on/off DC voltage levels. Each module provides up to 4000 volts (transient) of optical isolation between field inputs and the logic output of the circuit.

All DC input modules except the G4IDC5K and G4IDC5D are designed with filtering on the input and a hysteresis amplifier, providing high noise rejection and transient-free, "clean" switching. The G4IDC5K is a fast-switching module used to detect signals produced by photoelectric switches and TTL devices. The low-cost G4IDC5D is used for data acquisition.

The G4IDC5MA is a special module featuring a manual-on/manual-off/automatic switch, ideal for diagnostic testing of control applications.

The G4IDC5-SW and G4IDC5-SWNC modules supply power to an external dry contact switch and sense switch closure (SW) or opening (SWNC).

Typical applications for DC input modules include sensing the presence or absence of voltage and sensing contact closure from sources such as proximity switches, limit switches, selector switches, push buttons, photoelectric switches, and TTL-compatible devices.

Compatible with Raspberry Pi

The following G4 digital DC input modules can be used with the Digital I/O Carrier Board for Raspberry Pi® (part number OPTO-P1-40P) to monitor and control industrial devices with your Raspberry Pi:

G4IDC5
G4IDC5D
G4IDC5G
G4IDC5MA

Part Numbers

Part	Description
G4IDC5*	G4 DC Input 10–32 VDC, 5 VDC Logic
G4IDC5B	G4 DC Input 4–16 VDC, 5 VDC Logic High Speed
G4IDC5D*	G4 DC Input 2.5–28 VDC, 5 VDC Logic
G4IDC5G*	G4 DC Input 35–60 VDC, 5 VDC Logic
G4IDC5K	G4 DC Input 2.5–16 VDC, 5 VDC Logic Very High Speed
G4IDC5MA*	G4 DC Input 10–32 VDC, 5 VDC Logic With Manual/Auto Switch
G4IDC5-SW	G4 Switch Status Input, Self-powered, Normally Open
G4IDC5-SWNC	G4 Switch Status Input, Self-powered, Normally Closed
G4IDC15	G4 DC Input 10–32 VDC, 15 VDC Logic
G4IDC24	G4 DC Input 10–32 VDC, 24 VDC Logic

* Compatible with Raspberry Pi

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SPECIFICATIONS

	Units	G4IDC5*	G4IDC5B	G4IDC5D*	G4IDC5G*
Input voltage range	VDC VAC	10–32 12–32	4–16 4–16	2.5–28 —	35–60 35–60
Key feature		—	Higher speed	High speed	—
Input current at maximum line	mA	25	45	30	6
Isolation, input-to-output (transient): 1 ms 1 minute	 V V	 4000 1500	 4000 1500	 4000 1500	 4000 1500
Turn-on time	ms	5	0.05	1	10
Turn-off time	ms	5	0.1	1.5	10
Input allowed for off-state	mA, V	1, 3	0.7, 1	0.2, 1	0.7, 7
Nominal output supply voltage	VDC	5	5	5	5
Output supply voltage range	VDC	4.5–6	4.5–6	4.5–6	4.5–6
Output supply current at nominal logic voltage	mA	12	12	12	12
Input resistance (R1 in schematic)	ohms	1.5 K	300	900	10 K
Control resistance (Rc in schematic)	ohms	220	220	470	220
Output voltage drop	V @ 50 mA	0.4	0.4	0.4	0.4
Output current (sinking)	mA	50	50	50	50
Output leakage with no input	microamps @ 30 VDC	100	100	10	100
Transistor	V breakdown	30	30	30	30
Temperature: Operating Storage	 °C °C	 –30 to +70 –30 to +85	 –30 to +70 –30 to +85	 –30 to +70 –30 to +85	 –30 to +70 –30 to +85

* Compatible with Raspberry Pi

G4IDC5-SW and G4IDC5-SWNC modules

See page 4 for specifications and other information for the G4IDC5-SW and G4IDC5-SWNC self-powered modules.

SPECIFICATIONS (CONT.)

	Units	G4IDC5K	G4IDC5MA*	G4IDC15**	G4IDC24**
Input voltage range	VDC VAC	2.5–16 —	10–32 12–32	10–32 12–32	10–32 12–32
Key feature		Highest speed	Diagnostic switch	—	—
Input current at maximum line	mA	30	25	25	25
Isolation, input-to-output (transient): 1 ms 1 minute	 V V	 4000 1500	 4000 1500	 4000 1500	 4000 1500
Turn-on time	ms	0.025***	5	5	5
Turn-off time	ms	0.025***	5	5	5
Input allowed for off-state	mA, V	0.2, 1	1, 3	1, 3	1,3
Nominal output supply voltage	VDC	5	5	15	24
Output supply voltage range	VDC	4.5–6	4.5–6	12–18	20–30
Output supply current at nominal logic voltage	mA	12	12	15	18
Input resistance (R1 in schematic)	ohms	500	1.5 K	1.5 K	1.5 K
Control resistance (Rc in schematic)	ohms	220	220	1 K	2.2 K
Output voltage drop	V @ 50 mA	0.4	0.4	0.4	0.4
Output current (sinking)	mA	50	50	50	50
Output leakage with no input	microamps @ 30 VDC	100	100	100	100
Transistor	V breakdown	30	30	30	30
Temperature: Operating Storage	 °C °C	 −30 to +70 −30 to +85	 −30 to +70 −30 to +85	 −30 to +70 −30 to +85	 −30 to +70 −30 to +85

* Compatible with Raspberry Pi
** Not for use with Opto 22 brains
*** At 5Vp-p square wave input, 50% duty cycle

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G4IDC5-SW AND G4IDC5-SWNC MODULES

Description

Each G4IDC5-SW and G4IDC5-SWNC module provides one isolated channel of contact status input. Each module supplies 13 volts of power to an external dry contact switch. The G4IDC5-SW senses switch closure; the G4IDC5-SWNC senses switch opening. Each user-supplied switch is connected with two wires. Because these modules include power for the switch, they are particularly cost-effective when labor costs for wiring external power are high.

Typical switches for use with these modules are switched status sensors (level sensors, pressure indicators, etc.), magnetic reed switches (used on doors or windows for burglar alarms), snap-action micro switches, the auxiliary switches on motor starters, and most relay contacts.
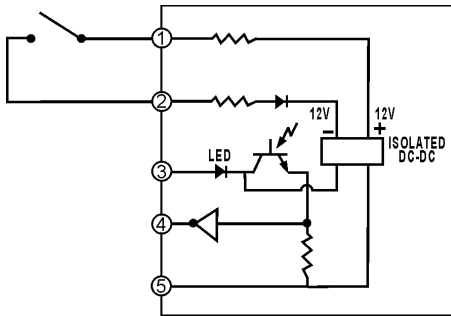
CAUTION: G4IDC5-SW and G4IDC5-SWNC inputs are not intended to be used with contacts that are connected to any external user-supplied voltage or currents.
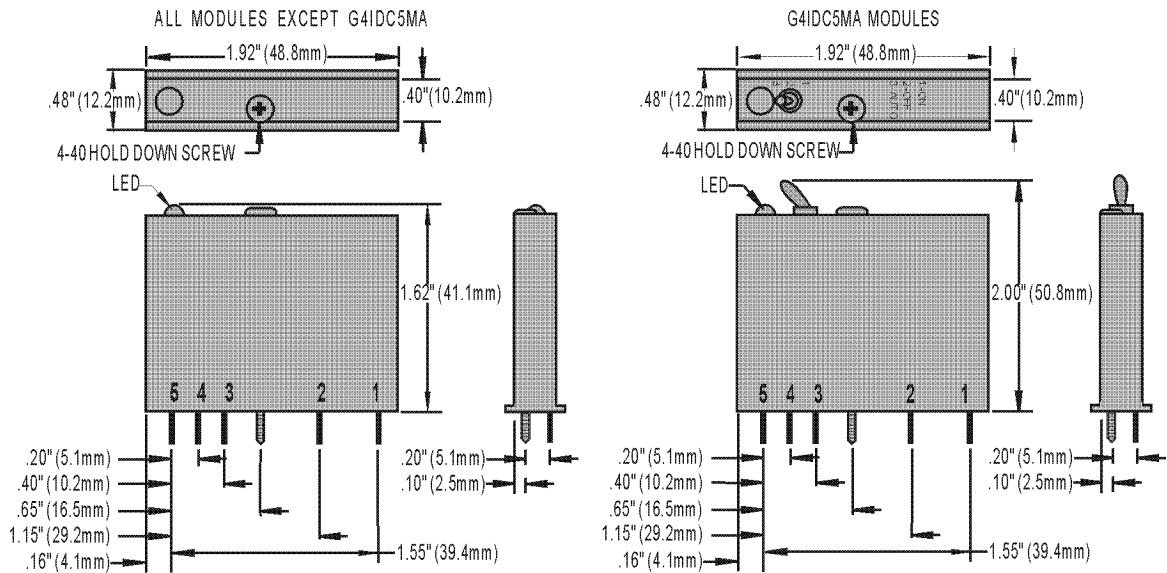
Specifications

Field Side Ratings	
Open Circuit Voltage (Switch Open)	11 VDC min., 13 VDC typical, 15 VDC max.
Short Circuit Current (Switch Closed)	6 milliamps nominal
Minimum Off Resistance	≥20 K ohms
Maximum Allowable On Resistance (Wire + Contact Resistance)	500 ohms
Logic Side Ratings	
Logic Output Voltage for G4IDC5-SW (normally open)	<0.5 V max. (switch closed; LED on) @ 2 mA sinking 2.7 V min. (switch open; LED off) @ 0.4 mA sourcing
Logic Output Voltage for G4IDC5-SWNC (normally closed)	<0.5 V max. (switch open; LED on) @ 2 mA sinking 2.7 V min. (switch closed; LED off) @ 0.4 mA sourcing
Maximum Operating Common Mode Voltage (Field Term to Logic Connector)	250 V
Power Requirements:	5 VDC (±0.25) @ 25 mA nom.
Module Ratings	
Number of Channels Per Module	1
Turn-on Time	8 msec typical
Turn-off Time	8 msec typical
Input-to-output Isolation (transient)	4000 V AC/DC
Temperature	0 °C to 70 °C, operating −30 °C to 85 °C, storage

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Schematic

Dimensions

ALL MODULES EXCEPT G4IDC5MA

1.92" (48.8mm)
.48" (12.2mm)
.40" (10.2mm)
4-40 HOLD DOWN SCREW
LED
1.62" (41.1mm)
5 4 3 2 1
.20" (5.1mm)
.40" (10.2mm)
.65" (16.5mm)
1.15" (29.2mm)
.16" (4.1mm)
.20" (5.1mm)
.10" (2.5mm)
1.55" (39.4mm)

G4IDC5MA MODULES

1.92" (48.8mm)
.48" (12.2mm)
.40" (10.2mm)
4-40 HOLD DOWN SCREW
LED
2.00" (50.8mm)
5 4 3 2 1
.20" (5.1mm)
.40" (10.2mm)
.65" (16.5mm)
1.15" (29.2mm)
.16" (4.1mm)
.20" (5.1mm)
.10" (2.5mm)
1.55" (39.4mm)

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Schematics

TYPICAL MOUNTING RACK

AC / DC INPUT MODULE

G4IDC5D & G4IDC5K MODULES ONLY

VAC OR VDC

SCREW TERMINALS

LOGIC VOLTAGE

LOGIC OUTPUT

LOGIC GND

CONNECTOR

4.7K

R1

LED

Rc

EQUIVALENT CIRCUIT ONLY
NEGATIVE TRUE LOGIC

VDC ONLY

R1

LED

Rc

EQUIVALENT CIRCUIT ONLY
NEGATIVE TRUE LOGIC

TYPICAL MOUNTING RACK

G4IDC5MA MODULE ONLY

VAC OR VDC

SCREW TERMINALS

LOGIC VOLTAGE

LOGIC OUTPUT

LOGIC GND

CONNECTOR

4.7K

R1

LED

AUTO

OFF

ON

Rc

EQUIVALENT CIRCUIT ONLY
NEGATIVE TRUE LOGIC