



DC Output Modules

FEATURES

- Transient Protection: Meets the requirements of IEEE 472, "Surge Withstanding Capability Test"
- SPST, Normally Open
- UL, CSA, CE, TÜV Certified
- Optical Isolation
- OpenLine® and G5 Modules Provide Replaceable 5x20mm Glass Fuses
- Built-in Status LED
- Lifetime Warranty



70L-ODC

70G-ODC

70-ODC

70M-ODC

DIMENSIONS

For complete dimensional drawings, see pages L-4 or L-5.

FUSES

G5 Fuses are 5 Amp Littelfuse part number 217005 or equivalent. OpenLine® fuses are 3.15 Amp Littelfuse part number 2173.15.

Fuse kits available, see page L-104.

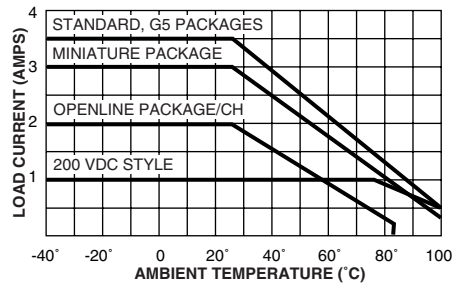
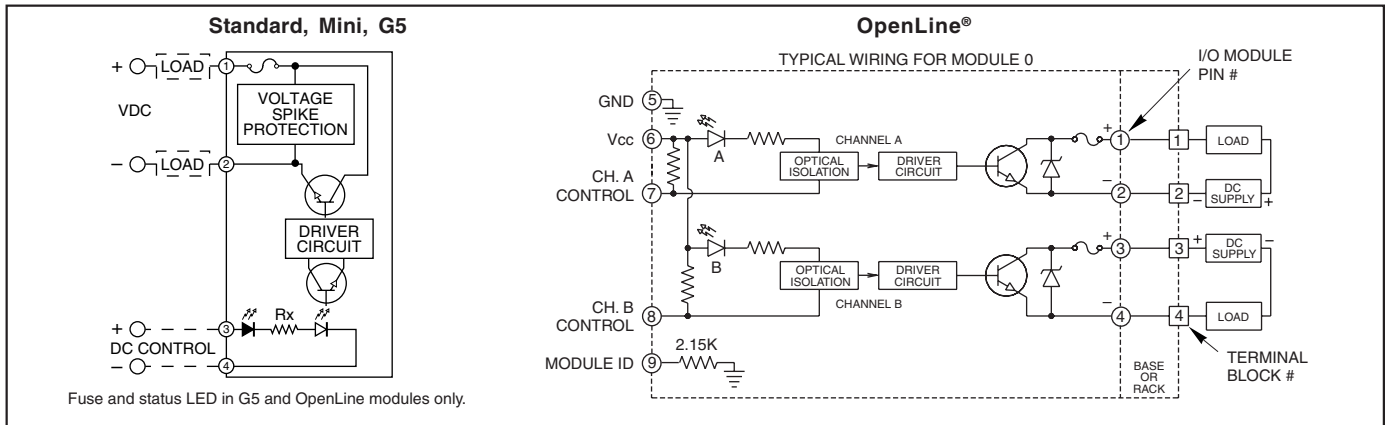


Figure 1

Maximum Current Versus Ambient Temperature

The chart indicates continuous current to limit the junction temperatures to 115°C. Information is based on steady state heat transfer in a 2 cubic foot sealed enclosure.

CIRCUITRY



Fuse and status LED in G5 and OpenLine modules only.

SPECIFICATIONS: By Package Style

Package Style		Std (70-)	Mini (70M-)	G5 (70G-)	OL (70L-)
Specifications	Units				
Load Current Range ¹	A	0.02-3.5	0.02-3.0	0.02-3.5	0.02-2.0/CH
Surge Current for 1 Sec.	A	5	5	5	5
Maximum Reverse Logic Voltage	Vdc	-5	-5	-5	-5
Isolation Voltage ²	Vrms	4000	4000	4000	2500
Vibration ³		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-6
Mechanical Shock ⁴		MIL-STD-202	MIL-STD-202	MIL-STD-202	IEC68-2-27
Storage Temp. Range	°C	-40 to 125	-40 to 125	-40 to 125	-40 to 100
Operating Temp. Range	°C	-40 to 100	-40 to 100	-40 to 100	-40 to 85
Warranty		Lifetime	Lifetime	Lifetime	Lifetime

¹ See Figure 1 for derating.

² Field to logic and channel-to-channel if Grayhill racks are used.

³ MIL-STD-202, Method 204, 20 G, 10-2000 Hz or IEC68-2-6, 0.15 mm/sec², 10-150 Hz.

⁴ MIL-STD-202, Method 213, Condition F, 1500 G or IEC68-2-27, 11 mS, 15g.



SPECIFICATIONS: By Part Number
Standard and Miniature Modules

Type/Function		Grayhill Part Number						
Miniature, Normally Open		70M-ODC5	70M-ODC5A	70M-ODC5B	70M-ODC15	70M-ODC15B	70M-ODC24	70M-ODC24B
Standard, Normally Open		70-ODC5	70-ODC5A	70-ODC5B	70-ODC15	70-ODC15B	70-ODC24	70-ODC24B
Specifications	Units							
Maximum Line Voltage	Vdc	60	200	60	60	60	60	60
Load Voltage Range	Vdc	3-60	4-200	3-60	3-60	3-60	3-60	3-60
Max. Off-State Leakage @ Max. Line	mA	1.5	0.01	0.01	1.5	0.01	1.5	0.01
Maximum Turn-On Time	µSec	20	75	75	20	75	20	75
Maximum Turn-Off Time	µSec	50	750	500	50	500	50	500
Typ. Power Dissipation	W/A	1	1.5	1	1	1	1	1
Clamping Voltage	Vdc	80	360	80	80	80	80	80
Nominal Logic Voltage (Vcc)	Vdc	5	5	5	15	15	24	24
Logic Voltage Range	Vdc	2.5-10	2.5-9	2.5-10	10-18	10-18	15-30	15-30
Maximum Logic Supply Current @ Nominal Vcc	mA	14	18	14	9	9	9	9
Nominal Input Resistance (Rx)	Ω	300	220	300	1800	1800	2700	2700
Minimum Drop Out Voltage	Vdc	1	1	1	1	1	1	1

G5 and OpenLine® Modules

Type/Function		Grayhill Part Number						
Fusible, Normally Open		70G-ODC5	70G-ODC5A	70G-ODC5B	70G-ODC15	70G-ODC15B	70G-ODC24	70G-ODC24B
Specifications	Units							
Maximum Line Voltage	Vdc	60	200	60	60	60	60	60
Load Voltage Range	Vdc	3-60	4-200	3-60	3-60	3-60	3-60	3-60
Max. Off-State Leakage @ Max. Line	mA	1.5	0.01	0.01	1.5	0.01	1.5	0.01
Maximum Turn-On Time	µSec	20	75	75	20	75	20	75
Maximum Turn-Off Time	µSec	50	750	500	50	500	50	500
Typ. Power Dissipation	W/A	1	1.5	1	1	1	1	1
Clamping Voltage	Vdc	80	360	80	80	80	80	80
Nominal Logic Voltage (Vcc)	Vdc	5	5	5	15	15	24	24
Logic Voltage Range	Vdc	4-6	4-6	4-6	10-20	10-20	18-32	18-32
Maximum Logic Supply Current @ Nominal Vcc	mA	13	13	13	9	9	9	9
Nominal Input Resistance (Rx)	Ω	150	150	150	1500	1500	2700	2700
Minimum Drop Out Voltage	Vdc	1	1	1	1	1	1	1

OpenLine® Modules

Type/Function		Grayhill Part Number		
Dual, Fusible, Normally Open		70L-ODC	70L-ODCA	70L-ODCB
Specifications	Units			
Maximum Line Voltage	Vdc	60	200	60
Load Voltage Range	Vdc	3-60	4-200	3-60
Max. Off-State Leakage @ Max. Line	mA	1.5	.01	.01
Maximum Turn-On Time	µSec	20	75	75
Maximum Turn-Off Time	µSec	50	750	500
Typ. Power Dissipation	WA	1	1.5	1
Clamping Voltage	Vdc	80	360	80
Nominal Logic Voltage (Vcc)	Vdc	5	5	5
Logic Voltage Range	Vdc	4.5-28	4.5-28	4.5-28
Maximum Logic Supply Current @ Nominal Vcc	mA	7/CH	7/CH	7/CH
Module ID Resistance to Logic Ground	Ω	2.15K	2.15K	2.15K
Minimum Drop Out Voltage	Vdc	1	1	1

Available from your local Grayhill Distributor.
For prices and discounts, contact a local Sales Office, an authorized local Distributor or Grayhill.

I/O Modules



I/O MODULES

Our line of pluggable input and output modules provide a low cost, versatile method for interconnecting real world analog and digital signals to data acquisition, monitoring, or control systems. All modules provide an optically isolated barrier between sensitive microprocessor or digital logic circuits and field power devices.

In the G5 and OpenLine® packages, analog and digital I/O modules are available with the same pin-out. This gives the flexibility of mixing and matching module types on the same mounting rack or base; making them perfect in applications which require interface to a variety of different sensors and loads.

The case color of the single point modules identify their function. The industry standard for single point I/O module case colors is:

- Digital AC Output Module = Black Case
- Digital DC Output Module = Red Case
- Digital AC Input Module = Yellow Case
- Digital DC Input Module = White Case

DIGITAL OUTPUT MODULES

Digital output modules are used to switch AC and DC loads such as solenoids, motors, or lamps from logic signal levels. Their inputs are directly compatible with TTL or CMOS interface circuitry.

AC output modules have zero voltage turn-on of the load to greatly reduce generated EMI and RFI. They are highly immune to electrical

transients, and have built-in RC snubber networks for increased capability with inductive loads.

DC output modules can operate DC loads over a wide voltage range and have built-in voltage spike protection.

DIGITAL INPUT MODULES

Digital input modules are used to monitor the status of a load or a sensor (such as a limit switch, pressure switch, or temperature switch). The output of these modules is a logic level signal which corresponds to the status of the device being monitored. A high level output signal indicates the load is off (the switch is open). A low level output signal indicates the load is on (the switch is closed). Input modules are designed to give fast, clean switching by providing filtering and hysteresis.

Input and output modules are compatible in that the output of one can drive the input of the other.

UL, CSA AND CE APPROVALS

As one of the world's leading manufacturers of I/O modules, we strive to assure that our products comply with all of the applicable international standards. In doing so, we believe your products will also be readily accepted and easily certified. All modules shown in this section have been tested to UL Standard 508 and are documented in UL file number E58632. Similarly, they have been tested to CSA

Standard 22.2 No. 14-95M and are documented in CSA file LR38763. Additionally, OpenLine® modules were tested and passed CSA 22.2 No. 213-M1987 Class I, Div. 2 Groups A, B, C and D. Parts bearing the CE logo indicate conformance with EN50082-2 and EN50081-2 (89/336/EEC EMC directive) as well as EN60950 (61010-1) for the low voltage directive. Contact Grayhill for copies of our Declaration of Conformity or visit our website. Parts bearing the TÜV logo indicate that they were the agency which performed the EN60950 evaluation.

CONSTRUCTION AND LIFETIME WARRANTY

All of our I/O modules are hard potted with thermally conductive epoxy to withstand harsh industrial environments. The modules provide optical isolation, immunity to mechanical shock and vibration, and operate over a wide temperature range. The module cases are a solvent resistant thermoplastic which meets UL94-V-0 rating. The terminal pins are a tin-plated copper wire. Component selection and surface mount construction allow low operating junction temperatures for long life. Superior design, rigorous testing, and field data give us the confidence to back our I/O modules with the industry's first lifetime warranty.

I/O MODULE WIRING

Analog and digital modules can be placed at any I/O location, however, to minimize the possibility of crosstalk and noise pickup it is a good practice to group similar module types together. 14 or 16 gauge wire is typically used to wire the field devices to the I/O rack terminal block.

PART NUMBER EXPLANATION: Digital I/O Modules

I/O Modules

70M-ODC5A

Module Type

- 70 = Digital Module, Standard Package
- 70G = Digital Module, G5 Package
- 70L = Digital Module, OpenLine® Package
- 70M = Digital Module, Mini Package

Function

- OAC = Digital Output AC
- ODC = Digital Output DC
- IAC = Digital Input AC
- IDC = Digital Input DC

Suffix

AC Inputs:	Blank = 120 Vac	A = 220 Vac	
DC Inputs:	Blank = 3-32 Vdc	B = Fast Switching	NP = 15-32 Vac/10-32 Vdc
	G = 35-60 Vac/Vdc	D = 2.5-28 Vdc	K = 2.5-16 Vdc
	L = Inductive loads	S = Dry Contacts	

AC Outputs: Blank = 120 Vac A = 220 Vac A-11 = Non-Zero Cross

MA = 120 Vac, Manual Override A-5 = Normally Closed

AMA = 240 Vac, Manual Override

DC Outputs: Blank = 3-60 Vdc Fast A = 4-200 Vdc R = Dry Contact

MA = 3-60 Vdc, Manual Override B = 3-60 Vdc, Low Leakage

Logic Supply Voltage or Range

Digital Modules: Blank = 4.5-28 Vdc (OpenLine®)

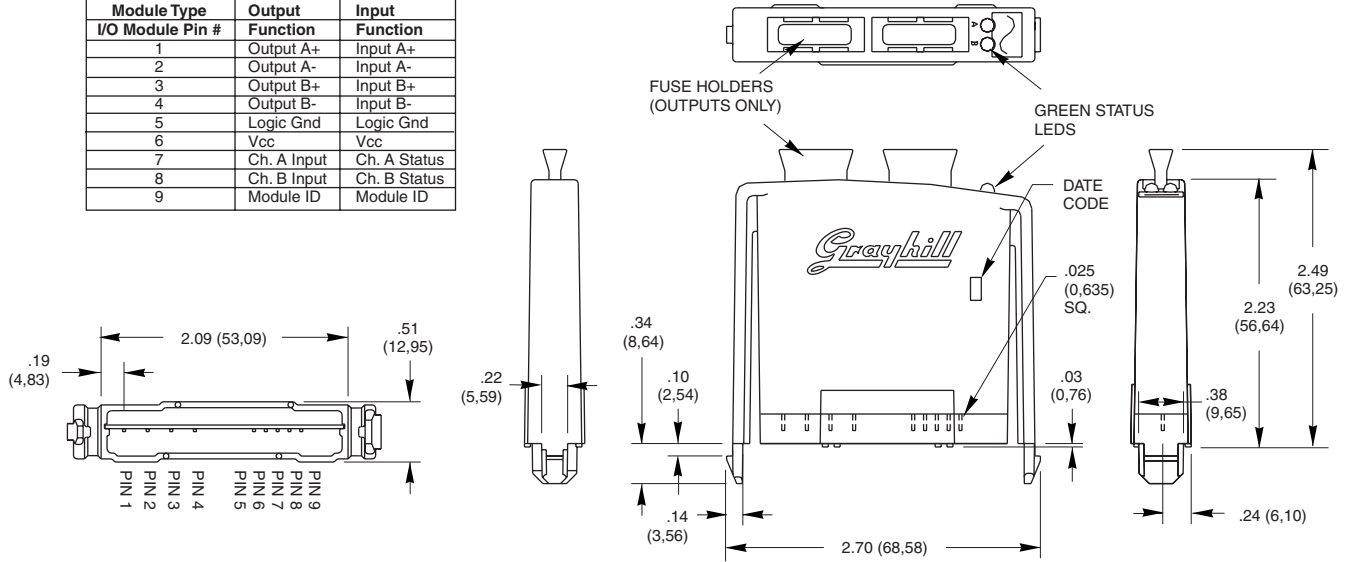
5 Vdc, 15 Vdc, 24 Vdc = Logic Supply Voltage (Standard, Mini, G5)

Analog Modules: 4.75-5.25 Vdc

DIMENSIONS: OpenLine® Digital Modules

Dimensions shown in inches (and millimeters).
Tolerances are ± .010 (0,25) unless indicated otherwise.

Module Type	Output	Input
I/O Module Pin #	Function	Function
1	Output A+	Input A+
2	Output A-	Input A-
3	Output B+	Input B+
4	Output B-	Input B-
5	Logic Gnd	Logic Gnd
6	Vcc	Vcc
7	Ch. A Input	Ch. A Status
8	Ch. B Input	Ch. B Status
9	Module ID	Module ID

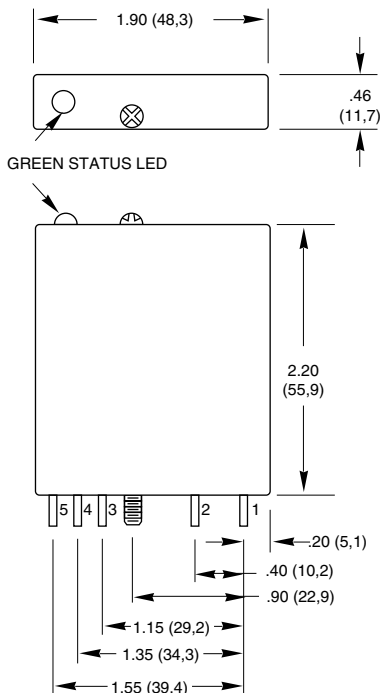


Note: For PC board layout information, request Bulletin #745

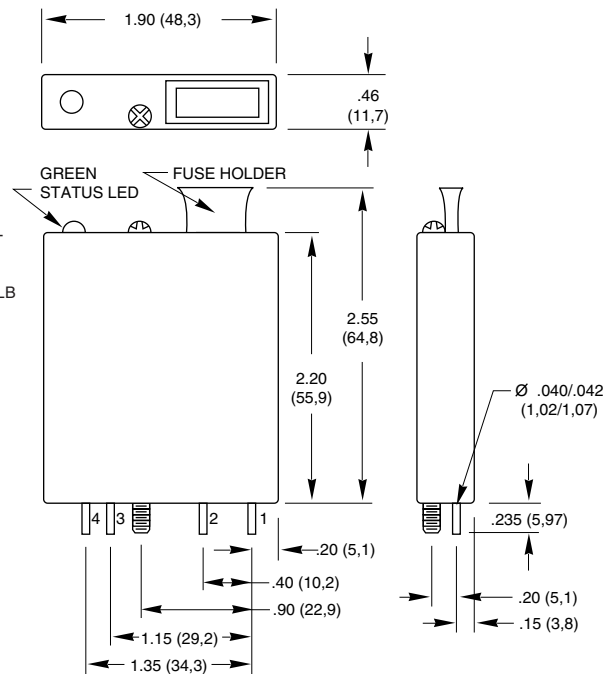
DIMENSIONS: G5 Digital Modules

Dimensions shown in inches (and millimeters).
Tolerances are ± .010 (0,25) unless indicated otherwise.

Input Modules



Output Modules



4-40 X 2-1/2" PHILLIPS HOLD-DOWN SCREW INCLUDED WITH EACH MODULE
MAXIMUM TORQUE = 5 FT-LB

I/O Modules

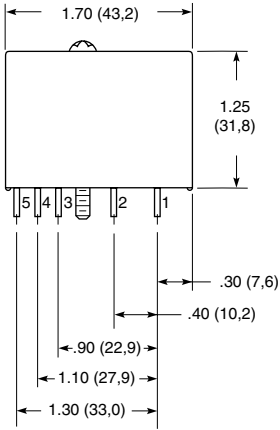
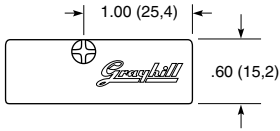


Digital I/O Modules Engineering Information

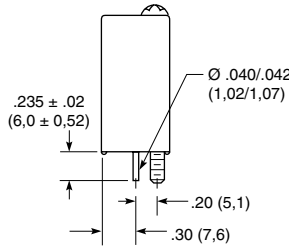
DIMENSIONS: Standard and Miniature Digital Modules

Dimensions shown in inches (and millimeters).
Tolerances are $\pm .010$ (0,25) unless indicated otherwise.

Standard Module

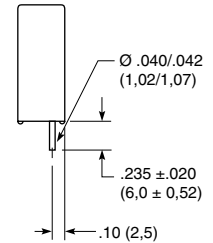
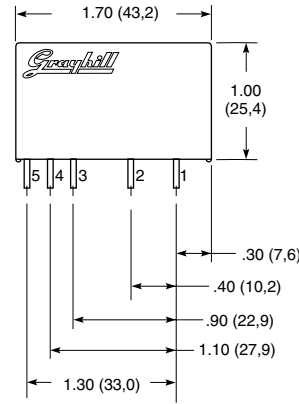
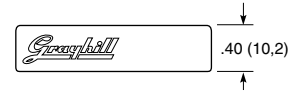


4-40 X 1-1/2" PHILLIPS HOLD-DOWN SCREW INCLUDED WITH EACH MODULE
MAXIMUM TORQUE = 5 FT-LB



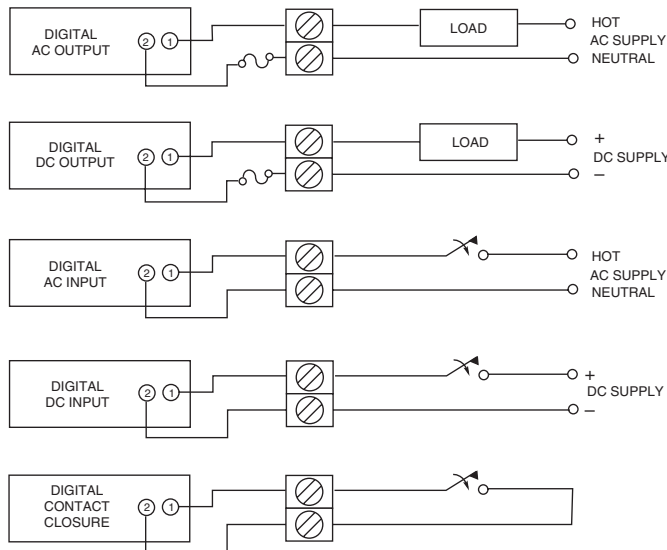
OUTPUT MODULES HAVE ONLY TERMINALS NUMBER 1-4

Miniature Module



OUTPUT MODULES HAVE ONLY TERMINALS NUMBER 1-4

WIRING DIAGRAM: Digital I/O Modules



I/O MODULE SIZE



Miniature
Saves 35% Space



Standard
Compatible Industry Size



G5
Fused Outputs,
Integral LED



OpenLine®
Two Channel,
Fused Outputs,
Integral LED

FUNCTION

(Check Specifications for Input and Output combinations, Feature or Option availability.)



Digital AC Output	Load	Control Vcc	Unique Options
	120 Vac 220 Vac	5 Vdc 15 Vdc 24 Vdc 4.5-28 Vdc	Random Turn-on Normally Closed Manual Override Inductive Load



Digital DC Output	Load	Control Vcc	Unique Options
	60 Vdc 200 Vdc	5 Vdc 15 Vdc 24 Vdc 4.5-28 Vdc	Dry Contacts Manual Override



Digital AC Input	Supply Vcc	Input Voltage	Unique Options
	5 Vdc 15 Vdc 24 Vdc 4.5-28 Vdc	120 Vac 220 Vac	High DC Voltage Input



Digital DC Input	Supply Vcc	Input Voltage	Unique Options
	5 Vdc 15 Vdc 24 Vdc 4.5-28 Vdc	3 to 32 Vdc	10 to 32 Vdc/ 15 to 32 Vac 8 KHz Switching 35 to 60 Vac/Vdc Contact Closure

I/O Modules