SNAP ANALOG OUTPUT MODULES

Features

- > Resolution = 0.004% of nominal range
- > Rugged packaging
- > Convenient pluggable wiring
- > Powered by a single 5-volt supply
- > Factory calibrated; no user adjustment necessary
- > Out-of-range indication
- > Operating temperature -20 °C to 70 °C
- > Accepts up to 22 to 14 AWG wire



SNAP Analog Output Modules

readings. Ground loop currents are caused when two grounded field devices share a connection, and the ground potential at each device is different.

Isolation also provides protection for sensitive control electronics from industrial field signals.

IMPORTANT: Since most SNAP dual-channel analog output modules provide two single-ended output channels with a common reference, these dual channels are transformer and optically isolated from other modules, but not from each other. However, SNAP-AOA-23-iSRC, SNAP-AOD-29, and SNAP-AOD-29-HFi do have channel-to-channel isolation.

Part Numbers

Part	Description	See
SNAP-AOA-23	Dual-channel analog output, current loop, 4–20mA	pg 4
SNAP-AOA-23-iSRC	Isolated dual-channel analog output, current loop, 4–20 mA, with loop sourcing	pg 5
SNAP-AOA-28	Dual-channel analog output, current loop, 0–20 mA	pg 8
SNAP-AOA-3	Single-channel current output, 4–20mA	pg 2
SNAP-AOD-29	Isolated dual-channel analog time-proportional digital output, 5 to 60 VDC	pg 9
SNAP-AOD-29-HFi	Isolated dual-channel analog TPO or PWM digital output, 2.5 to 24 VDC	pg 10
SNAP-AOV-25	Dual-channel analog voltage output, 0 to 10 VDC	pg 6
SNAP-AOV-27	Dual-channel analog voltage output, -10 to +10 VDC	pg 7
SNAP-AOV-5	Single-channel analog voltage output, 0 to 10 VDC	pg 3
SNAP-AOVA-8	8-channel analog multifunction output, voltage or current	pg 11
	M	ADE IN THE

Form 1066-24032 PAGE 1

DATA SHEE

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DESCRIPTION

SNAP analog output modules are part of Opto 22's SNAP PAC System. They mount on SNAP PAC racks along with other I/O modules and a SNAP PAC brain or R-series controller.

These software-configurable output modules handle a wide variety of signal levels. Most provide dual-channel packaging. All SNAP analog modules are factory calibrated.

SNAP analog output modules have an on-board microprocessor to provide module-level intelligence, which makes them an ideal choice for Original Equipment Manufacturers (OEMs). For additional information about the stand-alone operation of SNAP analog modules, please refer to the SNAP I/O Module Integration Guide (form 0876).

SNAP racks have a retention rail locking system. Use two 4-40 by 1/2-inch standard machine screws to hold each module securely in position on the SNAP rack.

Specifications and wiring diagrams are in module descriptions starting on page 2. Dimensional drawings begin on page 13.

Notes for legacy hardware: Most SNAP analog output modules can also be used with legacy SNAP Simple, SNAP Ethernet, and SNAP Ultimate brains and with serial SNAP brains such as the B3000. These modules can be mounted on SNAP B-series or M-series racks. Exceptions are noted in individual module descriptions.

Isolation

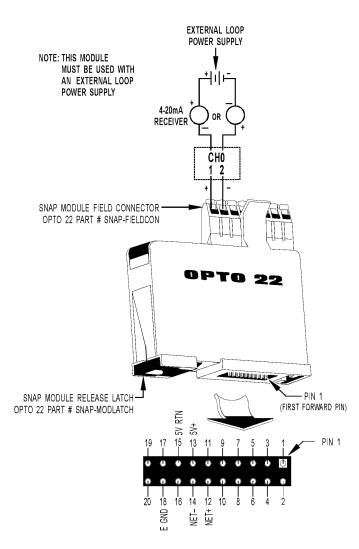
All SNAP analog output modules are isolated from all other modules and from the I/O processor (SNAP PAC brain or on-the-rack controller). On most dual-channel modules, the two channels are not isolated from each other. Exceptions: SNAP-AOA-23-iSRC, SNAP-AOD-29, and SNAP-AOD-29-HFi have two isolated channels.

Transformer isolation prevents ground loop currents from flowing between field devices and causing noise that produces erroneous

SINGLE-CHANNEL CURRENT OUTPUT 4-20 mA

Description

The SNAP-AOA-3 module provides a single channel of transformer and optically-isolated digital to analog conversion. The module has a true differential (floating) output that eliminates ground loops and has a nominal output range of 4 mA to 20 mA.



SNAP ANALOG MODULE BASE CONTROL CONNECTOR (BOTTOM VIEW)

IMPORTANT: The mounting rack connector has 24 pins; the module connector has 20 pins. The extra pins on the mounting rack connector prevent misalignment of the module during installation.

Part Number	Description
SNAP-AOA-3	Single-channel analog output 4–20 mA

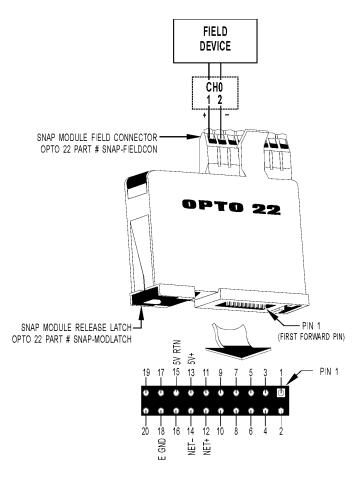
Specifications:

Input	12-bit s	erial data	l	
Output	4 to 20	mA (float	ing)	
Span	16 mA			
Resolution	3.9 mic	roamps		
Response Time (% of span/delta I/ delta time)	99.9%/	15.98 mA	/3 mS	
DC Common Mode Rejection	>-120 d	IB		
AC Common Mode Rejection	>-120 d	IB @ 60 H	Ηz	
Maximum Operating Common Mode Voltage	250 V			
Common Mode Resistance	>1000 I	M W		
Accuracy	0.1% of	span		
Gain Temperature Coefficient	50 PPN	1/ °C		
Offset Temperature Coefficient	20 PPM	1/ °C		
Module Power Requirements	5 Volts	DC (±0.1	5)@140) mA
Loop Power Requirements	10 Volts DC (min) to 32 Volts DC (max)			
Max. Loop Resistance (Ohms) @ Loop Supply	250 10V	350 12V	950 24V	1350 32V
Max. Loop Resistance formula		/oltage - 5 0.02	<u>5)</u>	
Ambient Temperature: Operating Storage		to 70 °C to 85 °C		
Humidity	5-95%,	non-cond	densing	
Torque, hold-down screws	Not to exceed 1 in-lb (0.11 N-m)		N-m)	
Torque, connector screws	5.22 in-lb (0.59 N-m)			
Wire size range	22 to 14	4 AWG		
Agency Approvals	UL, CE	, RoHS, E	DFARS; L	IKCA
Warranty	Lifetime)		



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SINGLE-CHANNEL VOLTAGE OUTPUT 0-10 VDC



SNAP ANALOG MODULE BASE CONTROL CONNECTOR (BOTTOM VIEW)

IMPORTANT: The mounting rack connector has 24 pins; the module connector has 20 pins. The extra pins on the mounting rack connector prevent misalignment of the module during installation.

Part Number	Description
SNAP-AOV-5	Single-channel analog output voltage 0 to 10 VDC

Description

The SNAP-AOV-5 module provides a single channel of transformer and optically-isolated digital to analog conversion. The module has a true differential (floating) output that eliminates ground loops and has a nominal output range of 0 VDC to +10 VDC.

Specifications:

Input	12-bit serial data
Output	0 to +10 Volts DC (floating)
Span	10 Volt span
Resolution	2.44 mV
Response Time (% of span/delta V/delta time)	99.9%/19.98 V/3 mS
DC Common Mode Rejection	>-120 dB
AC Common Mode Rejection	>-120 dB @ 60 Hz
Maximum Operating Common Mode Voltage	250 V
Common Mode Resistance	>1000 Megohms
Load Current	10 mA (floating)
Short Circuit Current Continuous	125 mA (typical)
Accuracy	0.1% of span
Gain Temperature Coefficient	50 PPM/°C
Offset Temperature Coefficient	20 PPM/°C
Power Requirements	5 Volts DC @ 150 mA
Ambient Temperature: Operating Storage	-20 °C to 70 °C -40 °C to 85 °C
Humidity	5-95%, non-condensing
Torque, hold-down screws	Not to exceed 1 in-lb (0.11 N-m)
Torque, connector screws	5.22 in-lb (0.59 N-m)
Wire size range	22 to 14 AWG
Agency Approvals	UL, CE, RoHS, DFARS, UKCA
Warranty	Lifetime

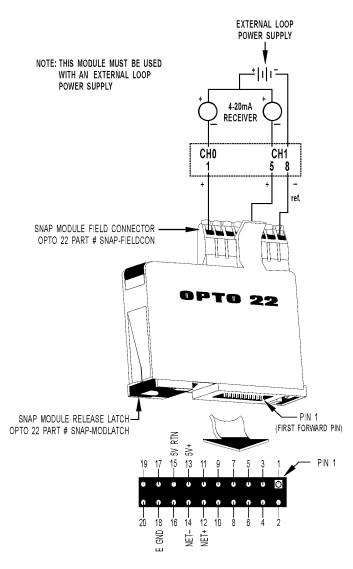


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DUAL-CHANNEL CURRENT OUTPUT 4-20 mA

Description

The SNAP-AOA-23 module provides a nominal output range of 4 mA to 20 mA. An external loop power source is required for the current loops. Note that the two channels share common reference terminals. Common reference terminals are 3, 4, 7, and 8.



SNAP ANALOG MODULE BASE CONTROL CONNECTOR (BOTTOM VIEW)

IMPORTANT: The mounting rack connector has 24 pins; the module connector has 20 pins. The extra pins on the mounting rack connector prevent misalignment of the module during installation.

Part Number	Description
SNAP-AOA-23	Dual-channel analog output current loop 4–20 mA

Specifications:

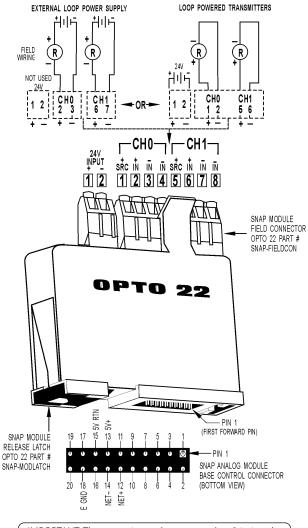
Input	12-bit serial data (each channel)	
Outputs	4 to 20 mA (each channel)	
Span	16 mA	
Resolution	3.9 microamps	
Response Time (% of span/delta I/ delta time)	99.9%/15.98 mA/3 mS	
DC Common Mode Rejection	>-120 dB	
AC Common Mode Rejection	>-120 dB @ 60 Hz	
Maximum Operating Common Mode Voltage	250 V	
Common Mode Resistance	>1000 Megohms	
Accuracy	0.1% of Span	
Gain Temperature Coefficient	50 PPM/°C	
Offset Temperature Coefficient	20 PPM/°C	
Module Power Require- ments	5 Volts DC (±0.15) @ 150 mA	
Loop Power Requirements	8 VDC (min) to 32 Volts DC (max)	
Max. Loop Resistance (Ohms) @ Loop Supply	250 450 650 1050 1450 8V 12V 15V 24V 32V	
Max. Loop Resistance formula	(Loop Voltage - 3) 0.02	
Ambient Temperature: Operating Storage	-20 °C to 70 °C -40 °C to 85 °C	
Humidity	5-95%, non-condensing	
Torque, connector screws	5.22 in-lb (0.59 N-m)	
Wire size range	22 to 14 AWG	
Agency Approvals	UL, CE, RoHS, DFARS; UKCA, NEBS	
Warranty	Lifetime	



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ISOLATED DUAL-CHANNEL CURRENT OUTPUT 4-20 MA



IMPORTANT: The mounting rack connector has 24 pins; the module connector has 20 pins. The extra pins on the mounting rack connector prevent misalignment of the module during installation.

Description

The SNAP-AOA-23-iSRC module provides a nominal output range of 4 mA to 20 mA. These modules include built-in loop sourcing capability.

With the connection of a single 24 V power supply, these modules source two 24 V loops. The loop sources are internally connected to the individual outputs.

The two channels and their loop sources are isolated from each other; they do not share any field connection. In addition, each loop source is current limited so that an external fault on one loop will not affect the other.

Part Number	Description
SNAP-AOA-23-iSRC	Isolated dual-channel analog 4–20 mA output with loop sourcing

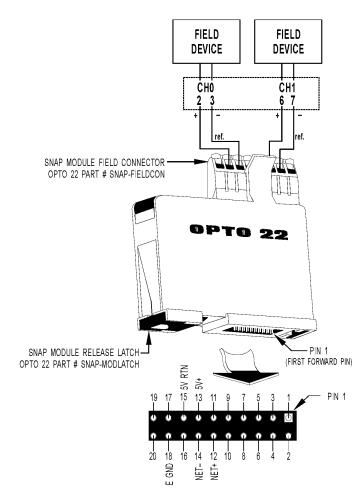
Specifications:

Input12-bit serial data (each channel)Outputs4 to 20 mA (each channel)Span16 mAResolution39 microampsResponse Time (of span/delta) delta)90%/15.98 mA/3 mSDC Common Mode Rejecto>120 dB (G to LT)AC common Mode Rejecto>120 dB (G to LT)Maximun Operating (of mom Mode Resistance)>100 MegotamsAccuracy01% of SpanOffset Temperature Coefficie30 PPM/°CGrifset Temperature Coefficie30 PPM/°CMaxiLoop Resistance (of sparing)30 coefficieMaxiLoop Resistance (of sparing)30 coefficieMaxiLoop Resistance (of sparing)30 coefficieMaxiLoop Resistance (of sparing)30 coefficieMaxiLoop Resistance (of coefficie)30 coefficieMaxiLoop Requirements (of coefficie)30 coefficieAppendence (of coefficie)30 coefficieAppendence (of coefficie)30 coefficieAppendence (of coefficie)30 coefficieAppendence (of coefficie)30 coefficie		
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Power Requirements5 Volts DC (±0.15) @ 200 mAPower Requirements - Loop Power (Input)From separate field connector; 24 VDC nominal (70 mA max) @ 24 V input, both loops @ 20 mA), 30 VDC maximumLoop Power (Output)24 VDC (±1.5 V) @ 20 mA Open loop: 30 V maximum Shorted loop: 24 mA nominalLED on top of moduleIndicates that there is power to the 24v source supply 2-pin connectorAgency ApprovalsCE, RoHS, DFARS, UKCATorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWG	Isolation: Transformer	1500 V
Power Requirements - Loop Power (Input)From separate field connector; 24 VDC nominal (70 mA max) @ 24 V input, both loops @ 20 mA), 30 VDC maximumLoop Power (Output)24 VDC (±1.5 V) @ 20 mA Open loop: 30 V maximum Shorted loop: 24 mA nominalLED on top of moduleIndicates that there is power to the 24v source supply 2-pin connectorAgency ApprovalsCE, RoHS, DFARS, UKCATorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWG	Isolation: Channel to Channel	250 V continuous (1500 V transient)
Power Requirements - Loop Power (Input)24 VDC nominal (70 mA max) @ 24 V input, both loops @ 20 mA), 30 VDC maximumLoop Power (Output)24 VDC (±1.5 V) @ 20 mA Open loop: 30 V maximum Shorted loop: 24 mA nominalLED on top of moduleIndicates that there is power to the 24v source supply 2-pin connectorAgency ApprovalsCE, RoHS, DFARS, UKCATorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWG	Power Requirements	5 Volts DC (±0.15) @ 200 mA
Loop Power (Output)Open loop: 30 V maximum Shorted loop: 24 mA nominalLED on top of moduleIndicates that there is power to the 24v source supply 2-pin connectorAgency ApprovalsCE, RoHS, DFARS, UKCATorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWG		24 VDC nominal (70 mA max) @ 24 V input, both loops
LED on top of modulesource supply 2-pin connectorAgency ApprovalsCE, RoHS, DFARS, UKCATorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWG	Loop Power (Output)	Open loop: 30 V maximum
Torque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWG	LED on top of module	
Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWG	Agency Approvals	CE, RoHS, DFARS, UKCA
Wire size range 22 to 14 AWG	Torque, hold-down screws	Not to exceed 1 in-lb (0.11 N-m)
Ŭ	Torque, connector screws	5.22 in-lb (0.59 N-m)
Warranty Lifetime	Wire size range	22 to 14 AWG
	Warranty	Lifetime



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DUAL-CHANNEL VOLTAGE OUTPUT 0-10 VDC



SNAP ANALOG MODULE BASE CONTROL CONNECTOR (BOTTOM VIEW)

IMPORTANT: The mounting rack connector has 24 pins; the module connector has 20 pins. The extra pins on the mounting rack connector prevent misalignment of the module during installation.

Part Number	Description
SNAP-AOV-25	Dual-channel analog output voltage 0 to 10 VDC

Description

The SNAP-AOV-25 module provides a nominal output range of 0 to +10 volts. Each channel can supply +5 mA of load current.

NOTE: Both channels share a common reference terminal.

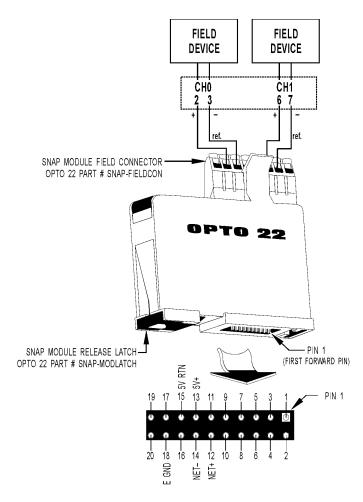
Specifications:

Input	12-bit serial data (each channel)
Outputs	0 to +10 Volts DC
Span	10 Volts
Resolution	2.44 mV
Response Time (% of span/delta V/delta time)	99.9%/19.98 V/3 mS
DC Common Mode Rejection	>-120 dB
AC Common Mode Rejection	>-120 dB @ 60 Hz
Maximum Operating Common Mode Voltage	250 V
Common Mode Resistance	>1,000 Megohms
Load Current (nominal)	5 mA (each channel)
Short Circuit Output Current Continuous	40 mA per channel
Accuracy	0.1% of Span
Gain Temperature Coefficient	50 PPM/°C
Offset Temperature Coefficient	20 PPM/°C
Isolation	1500 V
Power Requirements	5 Volts DC (±0.15) @ 150 mA
Ambient Temperature: Operating Storage	-20 °C to 70 °C -40 °C to 85 °C
Humidity	5-95%, non-condensing
Torque, hold-down screws	Not to exceed 1 in-lb (0.11 N-m)
Torque, connector screws	5.22 in-lb (0.59 N-m)
Wire size range	22 to 14 AWG
Agency Approvals	UL, CE, RoHS, DFARS; UKCA, NEBS
Warranty	Lifetime



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DUAL-CHANNEL VOLTAGE OUTPUT -10 TO +10 VDC



SNAP ANALOG MODULE BASE CONTROL CONNECTOR (BOTTOM VIEW)

IMPORTANT: The mounting rack connector has 24 pins; the module connector has 20 pins. The extra pins on the mounting rack connector prevent misalignment of the module during installation.

Part Number	Description
SNAP-AOV-27	Dual-channel analog voltage output -10 VDC to +10 VDC

Description

The SNAP-AOV-27 module provides a nominal output range of -10 to +10 volts. Each channel can supply ± 5 mA of load current.

NOTE: Both channels share a common reference terminal.

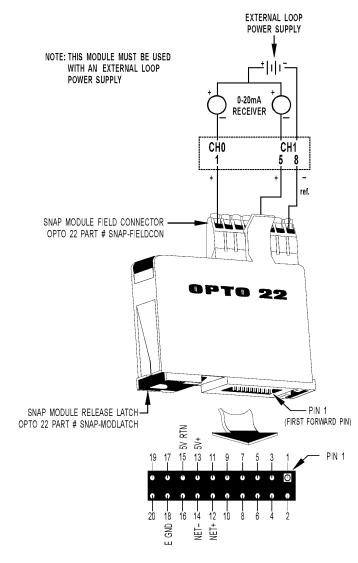
Specifications:

Input	12-bit serial data (each channel)
Outputs	-10 to +10 Volts DC
Span	20 Volts
Resolution	4.88 mV
Response Time (% of span/delta V/delta time)	99.9%/19.98 V/3 mS
DC Common Mode Rejection	>-120 dB
AC Common Mode Rejection	>-120 dB @ 60 Hz
Maximum Operating Common Mode Voltage	250 V
Common Mode Resistance	>1,000 Megohms
Load Current (nominal)	5 mA (each channel)
Short Circuit Output Current Continuous	40 mA per channel
Accuracy	0.1% of Span
Gain Temperature Coefficient	50 PPM/°C
Offset Temperature Coefficient	20 PPM/°C
Power Requirements	5 Volts DC (±0.15) @ 150 mA
Ambient Temperature: Operating Storage	-20 °C to 70 °C -40 °C to 85 °C
Humidity	5-95%, non-condensing
Torque, hold-down screws	Not to exceed 1 in-lb (0.11 N-m)
Torque, connector screws	5.22 in-lb (0.59 N-m)
Wire size range	22 to 14 AWG
Agency Approvals	UL, CE, RoHS, DFARS; UKCA
Warranty	Lifetime



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DUAL-CHANNEL CURRENT OUTPUT 0-20 mA



SNAP ANALOG MODULE BASE CONTROL CONNECTOR (BOTTOM VIEW)

IMPORTANT: The mounting rack connector has 24 pins; the module connector has 20 pins. The extra pins on the mounting rack connector prevent misalignment of the module during installation.

Part Number	Description
SNAP-AOA-28	Dual-channel analog output current loop 0–20 mA

Description

The SNAP-AOA-28 module provides a nominal output range of 0 mA to 20 mA. An external loop power source is required for the current loops.

NOTE: The two channels share a common reference terminal.

Specifications:

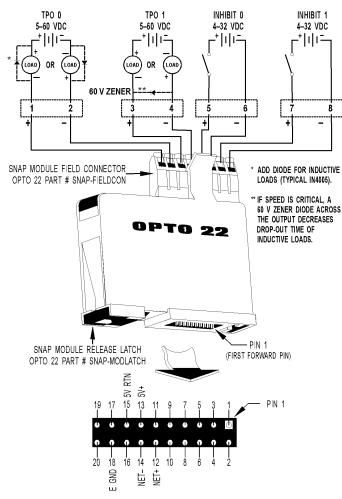
Input	12-bit serial data (each channel)
Outputs	0 to 20 mA (each channel)
Span	20 mA
Resolution	4.9 microamps
Response Time (% of span/delta I/ delta time)	99.9%/15.98 mA/3 mS
DC Common Mode Rejection	>-120 dB
AC Common Mode Rejection	>-120 dB @ 60 Hz
Maximum Operating Common Mode Voltage	250 V
Common Mode Resistance	>1000 Megohms
Accuracy	0.1% of Span
Gain Temperature Coefficient	50 PPM/°C
Offset Temperature Coefficient	20 PPM/°C
Module Power Requirements	5 Volts DC (±0.15) @ 150 mA
Loop Power Requirements	8 Volts DC (min) to 32 Volts DC (max)
Max. Loop Resistance (Ohms) @ Loop Supply	250 450 650 1050 1450 8V 8V 12V 24V 32V
Max. Loop Resistance formula	(Loop Voltage - 5) 0.02
Ambient Temperature: Operating Storage	-20 °C to 70 °C -40 °C to 85 °C
Humidity	5-95%, non-condensing
Torque, connector screws	5.22 in-lb (0.59 N-m)
Wire size range	22 to 14 AWG
Agency Approvals	UL, CE, ATEX, RoHS, DFARS; UKCA
Warranty	Lifetime



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DUAL-CHANNEL TIME-PROPORTIONAL OUTPUT VOLTAGE 5-60 VDC



SNAP ANALOG MODULE BASE CONTROL CONNECTOR (BOTTOM VIEW)

IMPORTANT: The mounting rack connector has 24 pins; the module connector has 20 pins. The extra pins on the mounting rack connector prevent misalignment of the module during installation.

Description

The SNAP-AOD-29 module provides two channels of time-proportional output (TPO). The outputs are used to switch or control DC loads such as lamps or indicators, solenoids, relay coils, and PLC logic. Each TPO channel can switch 0.5 A of load current ranging from 5 VDC to 60 VDC, over a period range of .25 seconds to 64.25 seconds.

Part Number	Description
SNAP-AOD-29	Isolated dual-channel analog Time-proportional digital output 5 to 60 VDC

Both TPO channels also have individual "inhibit" inputs dedicated to turning off the output, a useful feature in temperature and interlock control applications. The channels are optically isolated from each other.

NOTE: The SNAP-AOD-29 module cannot be used in a SNAP PAC IO4AB system. Instead, use the built-in TPO functionality available on all SNAP-PAC brains that support IO4AB.

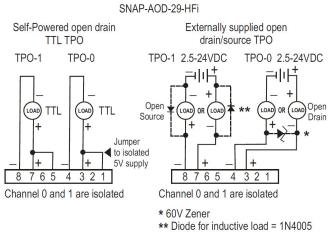
Specifications:

Input	12-bit serial data (each channel)
Switched Output at 45 °C Ambient at 70 °C Ambient	5 to 60 Volts DC 0.5 A 0.2 A
TPO Resolution	12-bit. Each bit = Period/4095 1 millisecond/bit default
Period Range	0.251 sec. to 64.25 sec. (0.251 sec for Ethernet-based I/O units) 0.251 seconds module default
Period Accuracy	± 0.5%
Period Resolution	.251 second
Inhibit Inputs On	4.0 Volts DC at 1.0 mA (32 Volts DC max.)
Off	1.0 Volt DC
Maximum Operating Com- mon Mode Voltage	250 V
Common Mode Resistance	>1,000 Megohms
Timebase Temperature Coef- ficient	50 PPM/°C
Power Requirements	5 Volts DC (±0.15) @ 150 mA
Ambient Temperature: Operating Storage	-20 °C to 70 °C -40 °C to 85 °C
Humidity	5-95%, non-condensing
Torque, hold-down screws	Not to exceed 1 in-lb (0.11 N-m)
Torque, connector screws	5.22 in-lb (0.59 N-m)
Wire size range	22 to 14 AWG
Agency Approvals	UL, CE, RoHS, DFARS; UKCA
Warranty	Lifetime



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DUAL-CHANNEL TIME-PROPORTIONAL OUTPUT VOLTAGE 2.5-24 VDC, 0 TO 100 KHZ



WARNING: Do not remove or replace connectors or cards while circuit is live unless area is known to be nonhazardous.

Description

The SNAP-AOD-29-HFi is a TPO (time-proportional output) or PWM (pulse-width modulation) module that converts an analog value to a digital on/off output. The outputs are used to switch or control DC loads such as lamps or indicators, solenoids, relay coils, and PLC logic. Each channel can switch 100 mA of load current ranging from 2.5 VDC to 24 VDC supplied externally, over a period range of 0.00001 seconds to 64.25 seconds.

The two channels are optically isolated from each other.

Five volts through a 200 Ohm pull-up resistor are provided internally for each channel for use with TTL loads. This feature means you don't have to provide the pull-up voltage supply required for each output.

This module requires a SNAP PAC controller or brain with SNAP PAC firmware version 9.3c or higher. It cannot be used with legacy controllers or brains.

NOTE: The SNAP-AOD-29-HFi module cannot be used in a SNAP PAC IO4AB system. Instead, use the built-in TPO functionality available on all SNAP-PAC brains that support IO4AB.

Part Number	Description
SNAP-AOD-29-HFi	Isolated dual-channel analog time-proportional or pulse-width modulation digital output, 2.5 to 24 VDC

Specifications:

Switched Output2.5 to 24 VDC at 100 mA supplied externallyMaximum Survivable Switch Voltage60 VDCPeak Current1.0 A (t < 10 milliseconds)Period Range0.0001 sec to 64.25 secPercent Range0.100%Percent Resolution0.024% (12-bit)Period Accuracy4.5 to 5.0 VDCPul-up Voltage200 OhmPul-up Voltage200 OhmMaximum Output Pulse Widh1 microsecondMaximum Output Pulse Widh50V ContinuousSolov Vortansient250V ContinuousPower Consumption1.5 W (300 mA @ 5.V)Pul-up Resistor20°C to 70° C -40°C to 85° CPumidity595%, non-condensingPurion Lingue, nonlector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGWarantyLifetime		
Voltage60 VDCPeak Current1.0 A (t < 10 milliseconds)	Switched Output	
Period Range0.00001 sec to 64.25 secPercent Range0-100%Period Resolution20.8 nanosecondsPercent Resolution0.024% (12-bit)Period Accuracy+- 0.005% of periodPull-up Voltage4.5 to 5.0 VDCPull-up Resistor200 OhmMinimum Output Pulse Width1 microsecondMaximum Operating Common Mode Voltage250V Continuous 1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Power Consumption-20 °C to 70 °C -40 °C to 85 °CHumidity595%, non-condensingTorque, hold-down screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, ROHS, DFARS; UKCA		60 VDC
Percent Range0-100%Period Resolution20.8 nanosecondsPercent Resolution0.024% (12-bit)Period Accuracy+- 0.005% of periodPull-up Voltage4.5 to 5.0 VDCPull-up Resistor200 OhmMinimum Output Pulse Width1 microsecondMaximum Operating Common Mode Voltage250 V Continuous 1500V TransientIsolation: Channel to Channel250V Continuous 1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Humidity5-95%, non-condensingTorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Peak Current	1.0 A (t < 10 milliseconds)
Period Resolution20.8 nanosecondsPercent Resolution0.024% (12-bit)Period Accuracy+- 0.005% of periodPull-up Voltage4.5 to 5.0 VDCPull-up Resistor200 OhmMinimum Output Pulse Width1 microsecondMaximum Operating Common Mode Voltage250 V ContinuousIsolation: Channel to Channel250V Continuous 1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Ambient Temperature: Operating Storage-20 °C to 70 °C -40 °C to 85 °CHumidity5-95%, non-condensingTorque, hold-down screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Period Range	0.00001 sec to 64.25 sec
Percent Resolution0.024% (12-bit)Period Accuracy+- 0.005% of periodPull-up Voltage4.5 to 5.0 VDCPull-up Resistor200 OhmMinimum Output Pulse Width1 microsecondMaximum Operating Common Mode Voltage250 V Continuous 1500V TransientIsolation: Channel to Channel250V Continuous 1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Humidity5-95%, non-condensingTorque, hold-down screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsKE, ROHS, DFARS; UKCA	Percent Range	0-100%
Period Accuracy+- 0.005% of periodPull-up Voltage4.5 to 5.0 VDCPull-up Resistor200 OhmMinimum Output Pulse Width1 microsecondMaximum Operating Common Mode Voltage250 V ContinuousIsolation: Channel to Channel250V Continuous 1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Ambient Temperature: Operating Storage-20 °C to 70 °C -40 °C to 85 °CHumidity5-95%, non-condensingTorque, hold-down screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Period Resolution	20.8 nanoseconds
Pull-up Voltage4.5 to 5.0 VDCPull-up Resistor200 OhmMinimum Output Pulse Width1 microsecondMaximum Operating Common Mode Voltage250 V ContinuousIsolation: Channel to Channel250V Continuous 1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Power Consumption-20 °C to 70 °C -40 °C to 85 °CHumidity595%, non-condensingTorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Percent Resolution	0.024% (12-bit)
Pull-up Resistor200 OhmMinimum Output Pulse Width1 microsecondMaximum Operating Common Mode Voltage250 V ContinuousIsolation: Channel to Channel250V Continuous 1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Ambient Temperature: Operating Storage-20 °C to 70 °C -40 °C to 85 °CHumidity5-95%, non-condensingTorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Period Accuracy	+- 0.005% of period
NameDescriptionMinimum Output Pulse Width1 microsecondMaximum Operating Common Mode Voltage250 V ContinuousIsolation: Channel to Channel250V Continuous 1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Ambient Temperature: Operating Storage-20 °C to 70 °C -40 °C to 85 °CHumidity5-95%, non-condensingTorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Pull-up Voltage	4.5 to 5.0 VDC
Maximum Operating Common Mode Voltage250 V ContinuousIsolation: Channel to Channel250V Continuous 1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Ambient Temperature: Operating Storage-20 °C to 70 °C -40 °C to 85 °CHumidity5-95%, non-condensingTorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, ROHS, DFARS; UKCA	Pull-up Resistor	200 Ohm
Mode Voltage250 V ContinuousIsolation: Channel to Channel250V ContinuousPower Consumption1.5 W (300 mA @ 5 V)Ambient Temperature: Operating Storage-20 °C to 70 °C -40 °C to 85 °CHumidity5-95%, non-condensingTorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Minimum Output Pulse Width	1 microsecond
Isolation: Channel to Channel1500V TransientPower Consumption1.5 W (300 mA @ 5 V)Ambient Temperature: Operating Storage-20 °C to 70 °C -40 °C to 85 °CHumidity5-95%, non-condensingTorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA		250 V Continuous
Ambient Temperature: Operating Storage-20 °C to 70 °C -40 °C to 85 °CHumidity5-95%, non-condensingTorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Isolation: Channel to Channel	
Operating Storage-20 °C to 70 °C -40 °C to 85 °CHumidity5-95%, non-condensingTorque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Power Consumption	1.5 W (300 mA @ 5 V)
Torque, hold-down screwsNot to exceed 1 in-lb (0.11 N-m)Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Operating	
Torque, connector screws5.22 in-lb (0.59 N-m)Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Humidity	5-95%, non-condensing
Wire size range22 to 14 AWGAgency ApprovalsCE, RoHS, DFARS; UKCA	Torque, hold-down screws	Not to exceed 1 in-lb (0.11 N-m)
Agency Approvals CE, RoHS, DFARS; UKCA	Torque, connector screws	5.22 in-lb (0.59 N-m)
	Wire size range	22 to 14 AWG
Warranty Lifetime	Agency Approvals	CE, RoHS, DFARS; UKCA
	Warranty	Lifetime



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8-CHANNEL MULTIFUNCTION VOLTAGE/CURRENT OUTPUT

The SNAP-AOVA-8 is an analog output module with 8 channels, individually configurable for any one of six voltage or current output ranges:

Voltage	Self-sourcing Current
0 to 5 VDC	
0 to 10 VDC	4 to 20 mA
-5 to +5 VDC	0 to 20 mA
-10 to +10 VDC	

Each range has 4096 counts (12 bits) of resolution.

The SNAP-AOVA-8 requires a 24 VDC excitation voltage brought in through the field connector on the top of the module. This voltage is internally isolated with transformer and digital data isolators, and then used to source all channels.

Because all current is sourced from within the module using the 24 VDC excitation, current outputs are self-sourcing and cannot be used with an external loop supply or in loops that are loop-powered or have a self-sourcing device in the loop.

Each channel is individually current or voltage limited and not affected by opens or shorts on adjacent channels. Connect both wires

Specifications:

18 TO 32 VDC
200mA @ 32VDC, 250mA @ 24VDC, 350mA @ 18VDC
15 mS nominal
5 VDC (±0.15) @ 150 mA
250 volts
1500 V (transient)
>-120 dB
>-120 dB @ 60 Hz
9 mS nom (update 1 ch/ms)
-20 to 70 °C -40 °C to 85 °C
5-95%, non-condensing
Not to exceed 1 in-lb (0.11 N-m)
5.22 in-lb (0.59 N-m)
22 to 14 AWG
UL, CE, RoHS, DFARS; UKCA
Lifetime

Part Number	Description
SNAP-AOVA-8	8-channel analog multifunction output, voltage or current
SNAP-HD-20F6	6 ft. (1.8 m) wiring cable for SNAP-AOVA-8 module, with flying leads (required)

from the module, so that a change in output on one channel will not affect another channel.

All negative output terminals on the module are tied together internally. To prevent ground loops, use loads with isolated signal inputs or use devices with the same power source, so they have a common ground.

To wire the module, a 6-foot-long SNAP-HD-20F6 cable is required. The cable has a 20-pin connector at the module end and flying leads for wiring to field devices. See wiring information on page 12.

You can also use a SNAP-TEX-32 breakout board for wiring convenience. See the *SNAP TEX Cables & Breakout Boards Data Sheet* (form 1756) for more information.

The SNAP-AOVA-8 requires a SNAP PAC brain or rack-mounted controller with firmware version R9.4b or higher. It cannot be used with legacy controllers or brains.

Specifications (continued)

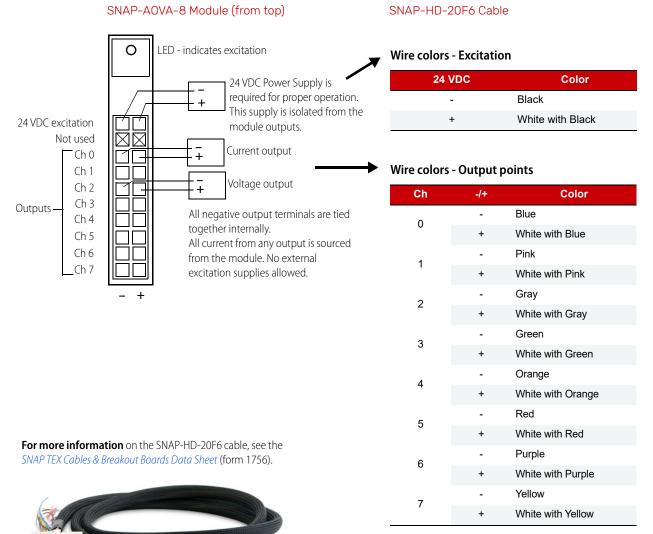
Voltage	Outputs
Output Range (Resolution)	0 to 5 VDC (1.22 mV) 0 to 10 VDC (2.44 mV) -5 to +5 VDC (2.44 mV) -10 to +10 VDC (4.88 mV)
Load Current	+/-10 mA min. each voltage out- put channel)
Short Circuit Current	16 mA Typ.
Accuracy	0.1% of span
Drift: Gain Temperature Coefficient Offset Temperature Coefficient	30 PPM / °C 15 PPM / °C
Current	Outputs
Output Range (Resolution)	4 to 20 mA (4 microamps) 0 to 20 mA (5 microamps)
	0 to 20 mA (5 microamps)
Maximum Loop Resistance	750 Ohms (each current output channel)
Maximum Loop Resistance Open Circuit Volts	750 Ohms (each current output
	750 Ohms (each current output channel) 27 VDC max.



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Wiring



NOTE: Yellow with purple and purple with yellow wires are not used.

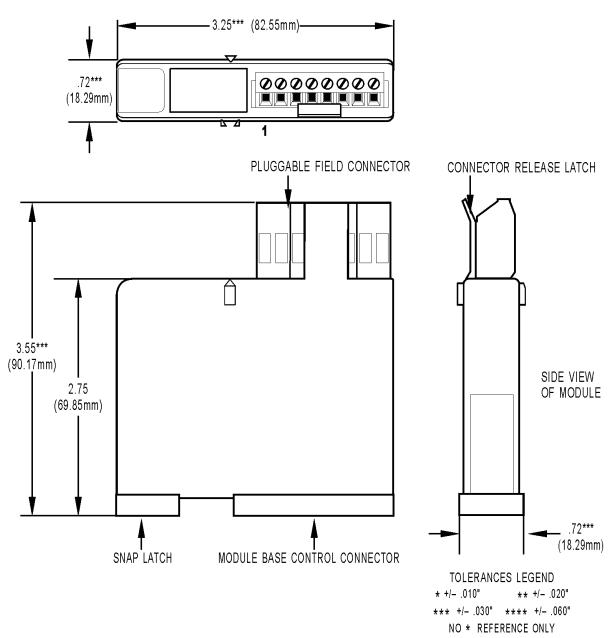


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DIMENSIONAL DRAWINGS

All Modules except SNAP-AOA-23-iSRC and SNAP-AOVA-8

Note: The SNAP-AOD-29 time-proportional output (TPO) module has integral LEDs for monitoring and troubleshooting the module's outputs and inhibit inputs.



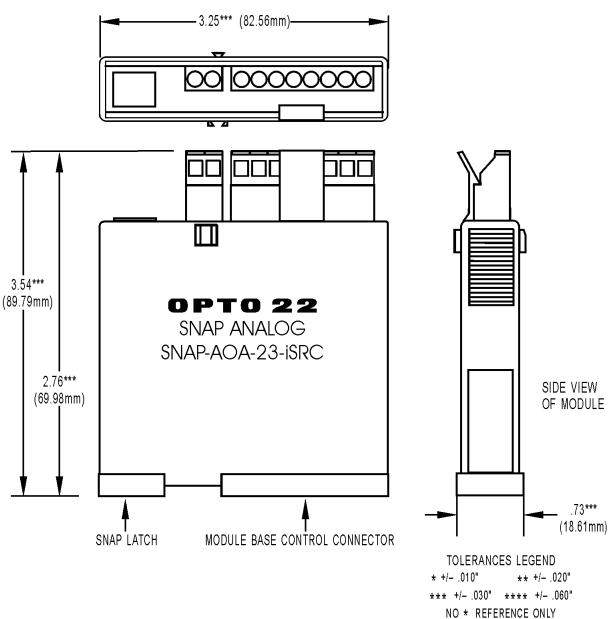
TOP VIEW OF MODULE



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DIMENSIONAL DRAWINGS

SNAP-AOA-23-iSRC only



TOP VIEW OF MODULE



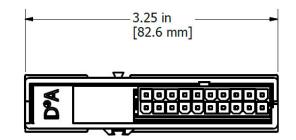
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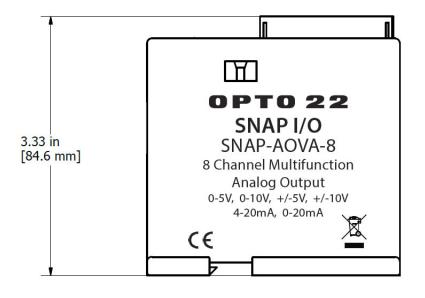


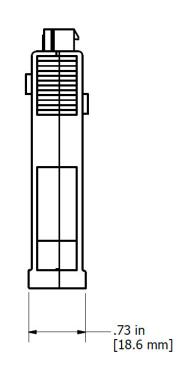
DIMENSIONAL DRAWINGS

SNAP-AOVA-8 only

TOP VIEW OF MODULE







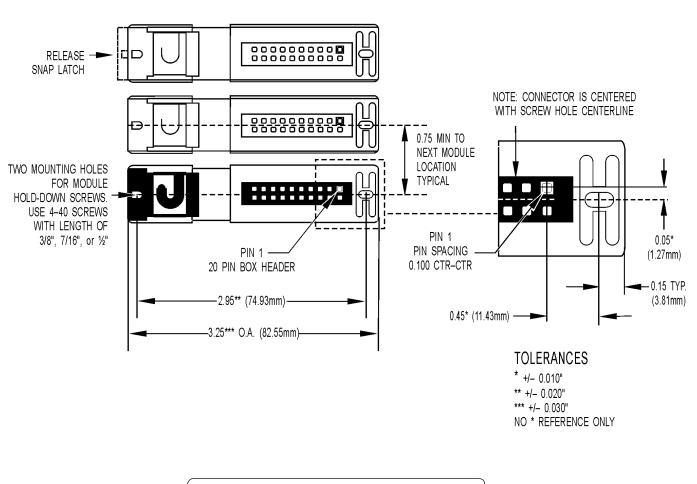


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DIMENSIONAL DRAWINGS

All Modules



BOTTOM VIEW OF MODULE

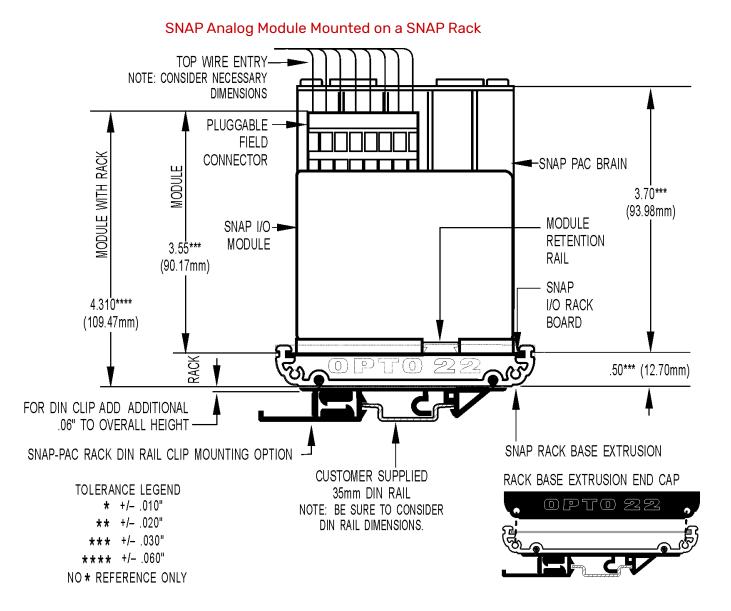
IMPORTANT: The mounting rack connector has 24 pins; the module connector has 20 pins. The extra pins on the mounting rack connector prevent misalignment of the module during installation.



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DIMENSIONAL DRAWINGS

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