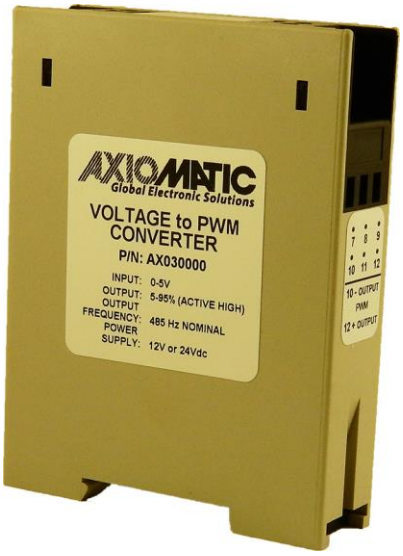
TECHNICAL DATASHEET #TDAX0300XX

Voltage or Current Signal Input, PWM Output Converter

3-way Isolation
DIN rail mount

P/N: AX030000, AX030002, AX030003, AX030004, AX030010

Features:



- 1 signal input:
  - Models AX030000, AX030003: 0-5 V
  - Models AX030002, AX030004: 0-10 V
  - Model AX030010: 4-20 mA
- 1 PWM signal output (All Models)
  - Models AX030000, AX030002: 485 Hz
  - Models AX030003, AX030004: Fixed at 100 Hz
  - Model AX030010: 550 Hz
- Three-way isolation between power supply, input and output.
- 12V or 24Vdc (nominal) power input
- DIN rail mount, IP20

Description

The V/I to PWM Converter is a single channel signal converter in a DIN rail mount enclosure. It is designed for interfacing with legacy components in an engine control system on power generator sets. There are three models accepting either a 0-5V, 0-10V or 4-20mA signal input and generating a PWM signal output.

Applications

The converter is designed for power generator set engine control system and other control applications.

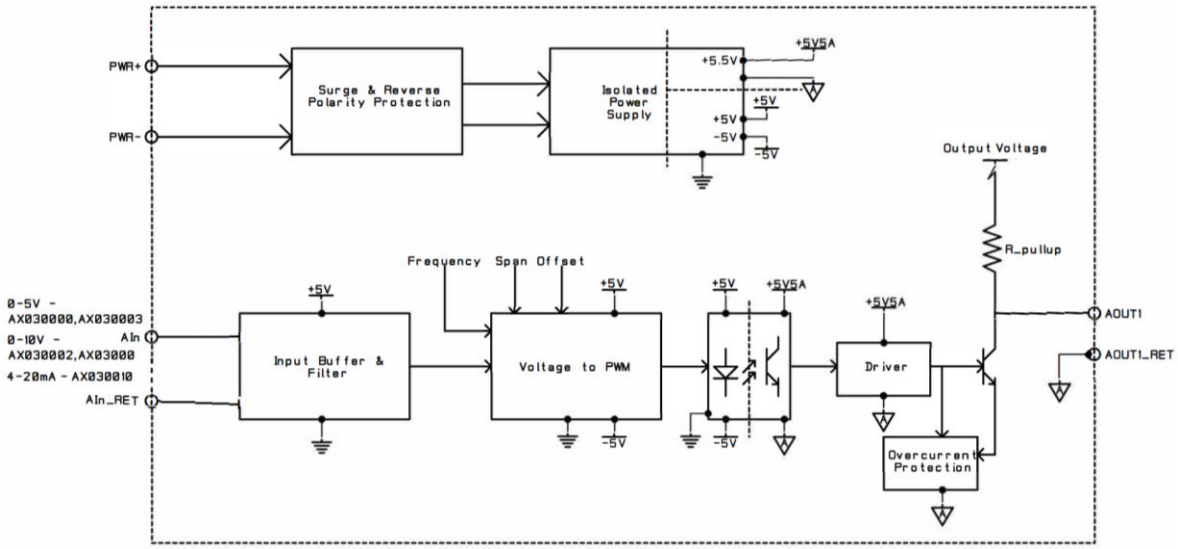
Ordering Part Numbers

Model P/N	*Description*	*Supersedes models*
AX030000	0-5 V input, PWM output, DIN rail mount	VPWMDR5V
AX030003	0-5 V input, 100 Hz PWM output, DIN rail mount	VPWMDR5V100Hz
AX030002	0-10 V input, PWM output, DIN rail mount	VPWMDR10V
AX030004	0-10 V input, 10 V/100 Hz PWM output, DIN rail mount	-----
AX030010	4-20 mA input, PWM output, DIN rail mount	IPWMDR420MA

Axiomatic Technologies Oy
Höytämöntie 6
33880 LEMPÄÄLÄ, Finland
Tel. +358 103 375 750
salesfinland@axiomatic.com
www.axiomatic.fi

Axiomatic Technologies Corporation
1445 Courtneypark Dr. E.
Mississauga, ON Canada L5T 2E3
Tel. 1 905 602 9270
sales@axiomatic.com
www.axiomatic.com

Block Diagram



Technical Specifications:

Specifications are indicative and subject to change. Actual performance will vary depending on the application and operating conditions. Users should satisfy themselves that the product is suitable for use in the intended application. All our products carry a limited warranty against defects in material and workmanship. Please refer to our Warranty, Application Approvals/Limitations and Return Materials Process as described on https://www.axiomatic.com/service/.

Power Input Specifications

Power Supply Input	12 or 24Vdc nominal operating voltage 9 to 36 Vdc power supply range for voltage transients
Surge Protection	Provided
Reverse Polarity Protection	Provided up to 50V
Over-voltage Protection	Provided (Hardware shuts down at 41V.)
Under-voltage Protection	Provided (Hardware shuts down at 7.5V with 1 V hysteresis.)
Quiescent Current	16 mA @ 12Vdc; 10 mA @ 24Vdc typical Model AX030004: 20 mA @ 12Vdc; 12 mA @ 24Vdc typical

Signal Input Specifications

Signal Input	1 isolated signal input (factory set) ○ Models AX030000, AX030003: 0-5 V ○ Models AX030002, AX030004: 0-10 V ○ Model AX030010: 4-20 mA With voltage inputs, short circuit protection is provided.
Minimum and Maximum Ratings	**Table 1.0. Absolute Maximum and Minimum Ratings** **Characteristic** / **Min** / **Max** / **Units** Power Supply: 9 / 36 / V dc Voltage Input: 0 / 25 / V dc Current Input[1]: 0 / 100 / mA Current Input – Voltage Level: 0 / 5 / Vdc [1]100 mA is valid at room temperature. Inputs are protected with resettable fuse that can trip below 100 mA depending on temperature.
Input Accuracy	±1 %
Input Impedance	0-5 V: 249.9 kΩ ±2 % 0-10 V: 304.1 kΩ ±2 % 4-20 mA: 50 Ω -1 % or +5 %
Analog Ground	1 provided

Signal Output Specifications

PWM Output	1 isolated PWM output PWM Frequency default settings: ○ Model AX030000: 0-5 V input has 485 Hz ±10 % output ○ Model AX030003: 0-5 V input has 100 Hz ±10 % output ○ Model AX030002: 0-10 V input has 475 Hz ±10 % output ○ Model AX030004: 0-10 V input has a fixed 10 V amplitude and 100 Hz ±10 % output. ○ Model AX030010: 4-20 mA input has 550 Hz ±10 % output Option: Other PWM frequency settings are available from 100 to 10,000 Hz. (A trimpot on the PCB is adjusted.) Duty Cycle default settings: ○ Model AX030000, AX030003: (0-5V input): 5 to 95 % D.C. (Active High) ○ Models AX030002, AX030004: (0-10 V input): 0-100 % Duty Cycle (Active High) ○ Model AX030010: (4-20 mA input): 10-90% Duty Cycle (Active High) Option: Other duty cycles available on request. Open-collector, 10 kΩ pull-up Low output voltage of less than or equal to 0.4 V High output voltage of less than or equal to 5.5 V ±3 % when output loaded with 1 MΩ Model AX030004: Low output voltage of less than or equal to 0.2 V High output voltage of less than or equal to 10 V ±3 % when output loaded with 1 MΩ
Output Accuracy	±1 % when duty cycle greater or equal to 5 % ±3 % when duty cycle below 5 %
Signal Ground	1 provided

General Specifications

Isolation	3-way isolation between input, output and power. 350 V_{RMS} between power supply and input/output 350 V_{RMS} between input and output Model AX030004: 350 V_{RMS} between all
Response Time	<40 ms
LED Indicator	Green ON = Power is ON
Adjustments – PWM Duty Cycle	Span and offset adjustment for PWM Duty Cycle is provided with trimpots. Span (Turn CCW to increase.) Offset (Zero) (Turn CW to increase.) Trimpots are 10 turns. For Model AX030000, AX030003: When 0.1 V is applied adjust Zero to 5 %. When 5 V is applied, adjust Span to 95 %. For Model AX030002, AX030004: When 0.5 V is applied adjust Zero to 5 %. When 9.5 V is applied, adjust Span to 95 %. For Model AX030010: When 4 mA is applied, adjust Zero to 10 %. When 20 mA is applied, adjust Span to the 90 %. PWM output can be measured using a multi-meter (with a PWM measurement feature).

Adjustments – Frequency Output	Frequency output adjustment can be made on request for units to ship with custom factory settings. Coarse and Fine trimpots are located on the PCB board and are only accessible by removing the PCB assembly from the enclosure. *Contact Axiomatic to arrange for factory set outputs different from the default settings.* If there is a need to adjust the frequency, remove the unit carefully from the enclosure, noting the orientation of the PCB assembly with the DIN rail foot and front label on the enclosure. These features can be used as orientation guides when re-inserting the PCB assembly. Adjust the coarse adjustment trimpot to obtain an output in the vicinity of the frequency required. Next, fine-tune it using the "fine" potentiometer. The sum of the minimum values of the potentiometers sets the high frequency (10 kHz), and the sum of the maximum values sets the low frequency (70 Hz).
Electrical Connections	#14-24 AWG screw terminals
Enclosure and Dimensions	JIT Components P/N: DR12, Polycarbonate DIN rail mount 75 x 98.5 x 22.5 mm (W x H x D) 2.95 x 3.88 x 0.89 inches Refer to dimensional drawings.
Operating Temperature	-40°C to 85°C (-40°F to 185°F)
Storage Temperature	-50°C to 125°C (-58°F to 257°F)
Weight	0.25 lbs. (0.11 kg)
Protection	IP40 rated enclosure, IP20 connectors Unit is conformal coated in its enclosure.
Mounting	The controller is designed to be installed in a control panel.

Dimensional Drawings

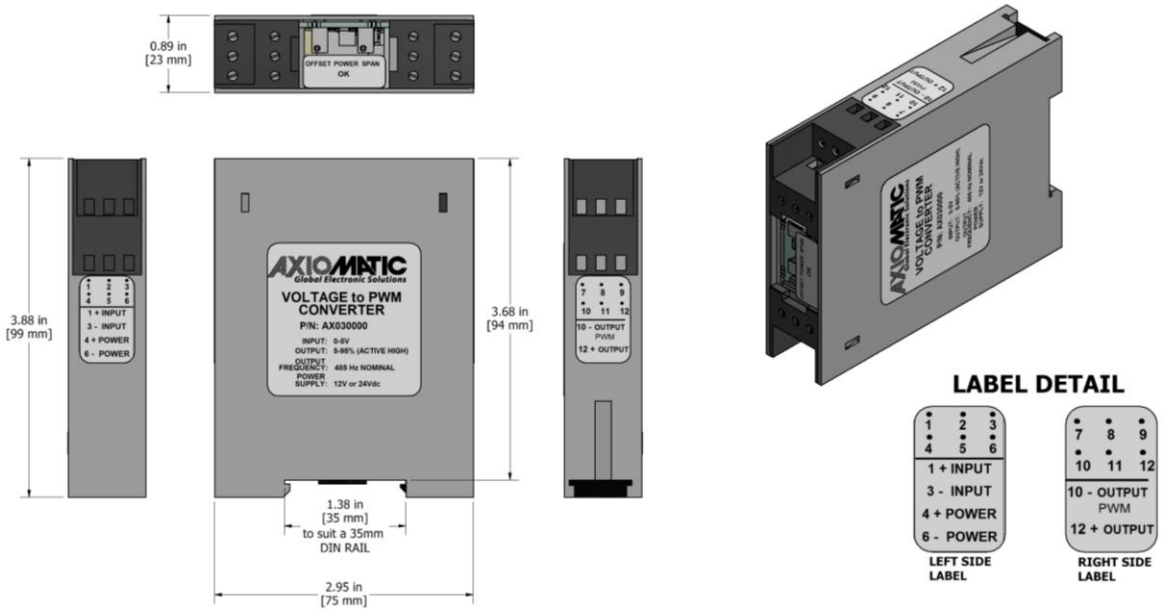


Figure 1.0 – Dimensions for AX030000

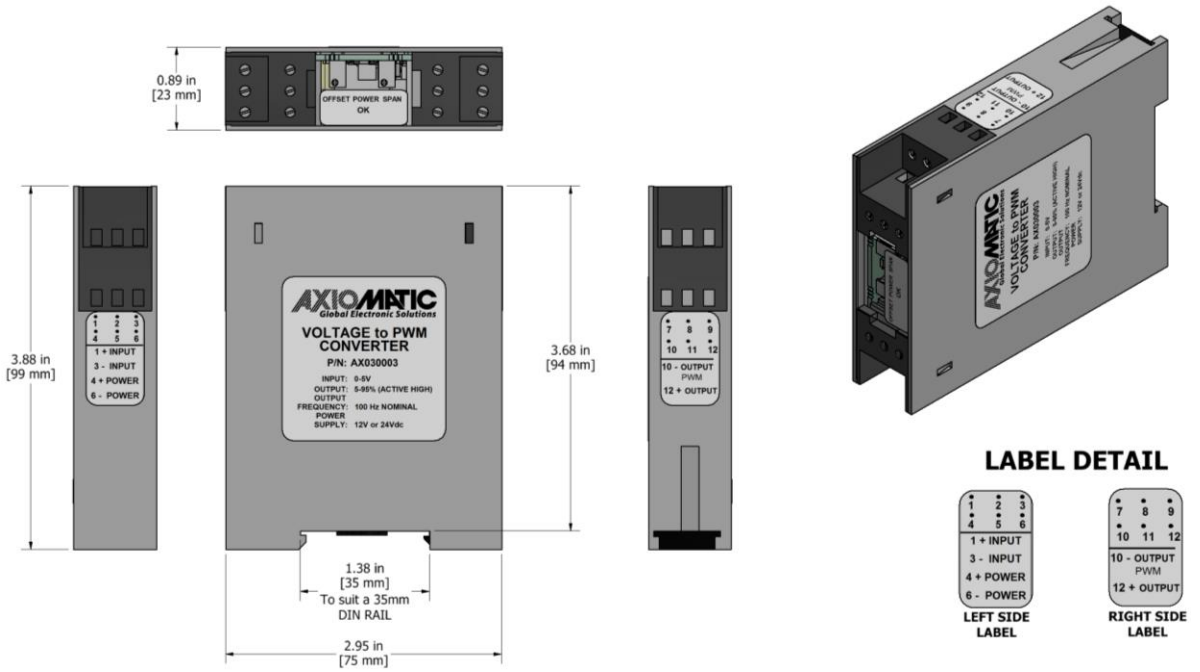


Figure 2.0 – Dimensions for AX030003

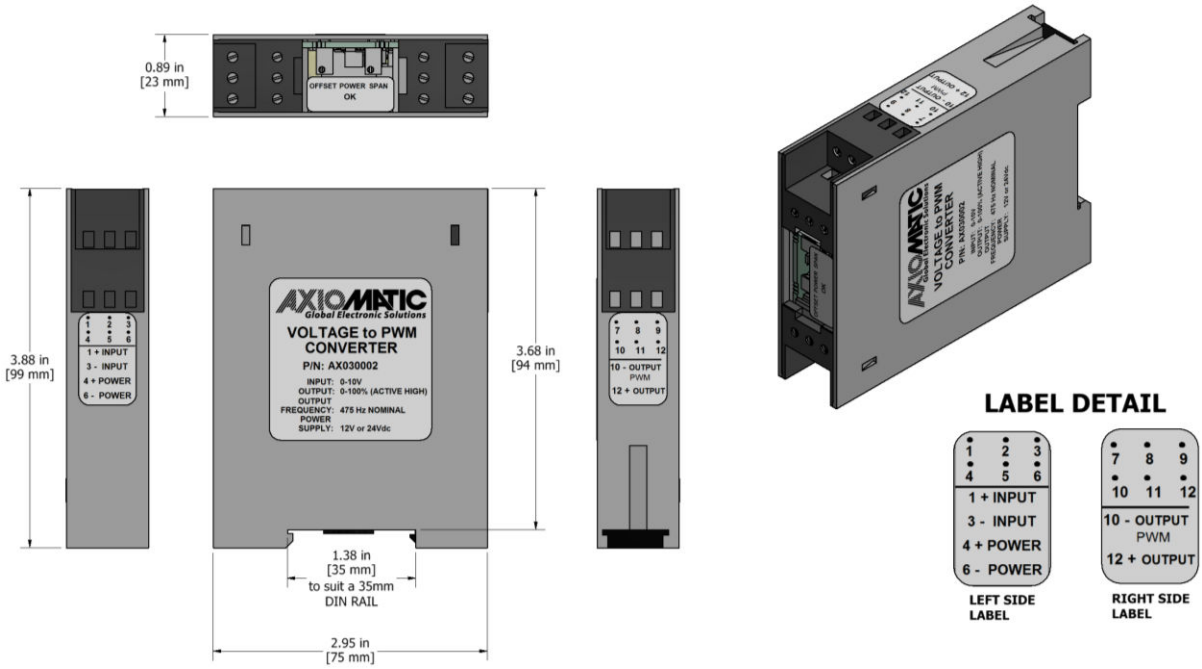


Figure 3.0 – Dimensions for AX030002

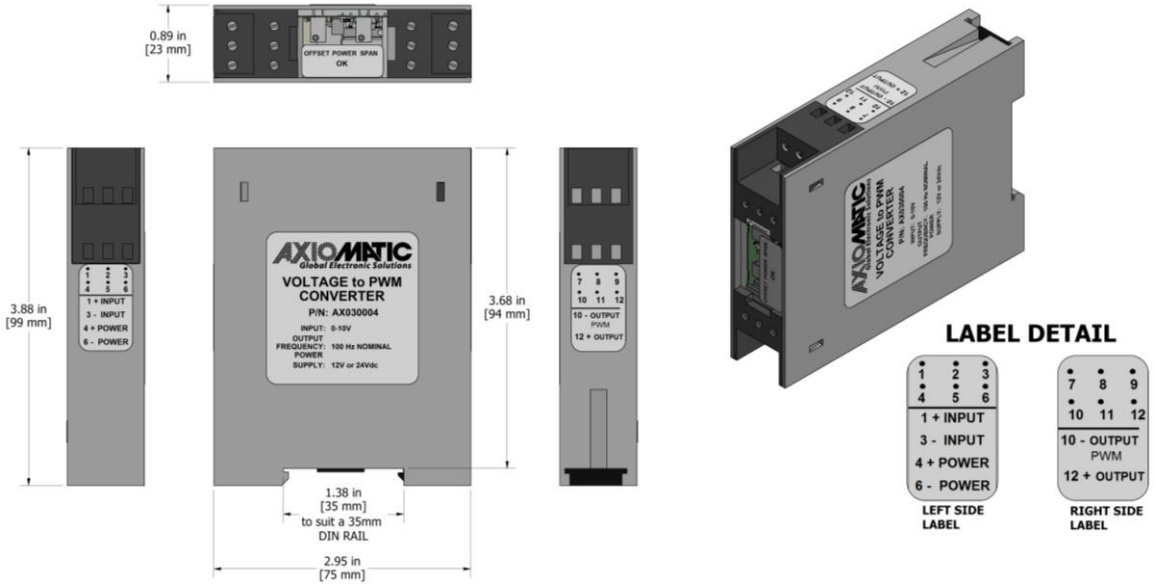


Figure 4.0 – Dimensions for AX030004

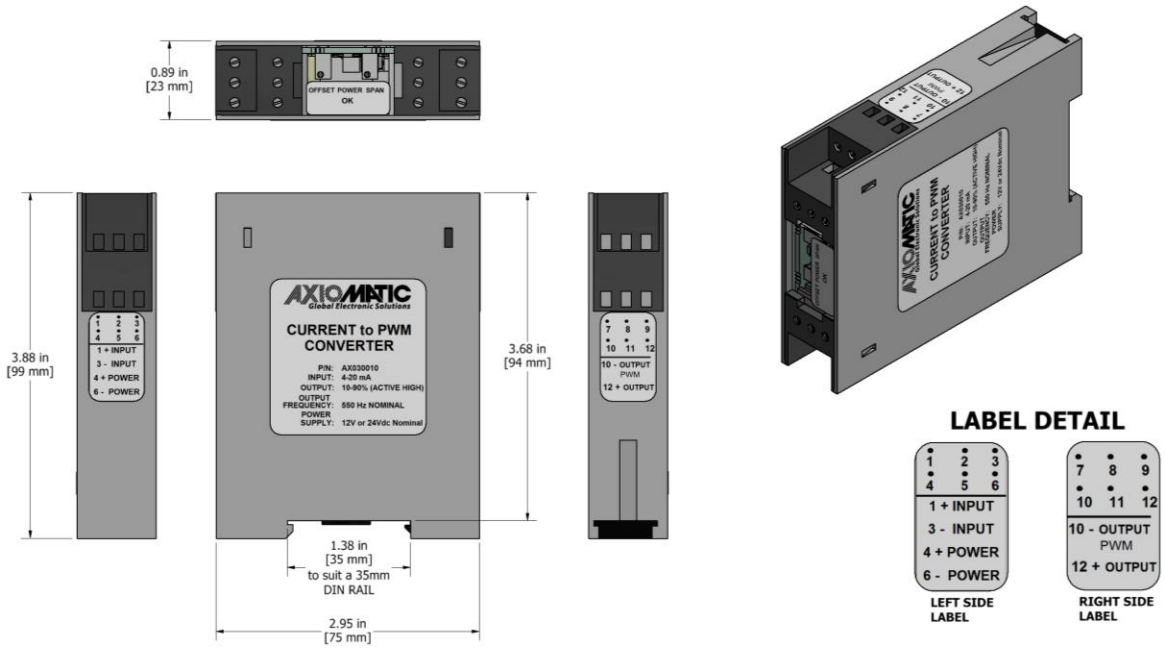


Figure 5.0 – Dimensions for AX030010

Form: TDAX0300XX-10/03/2024