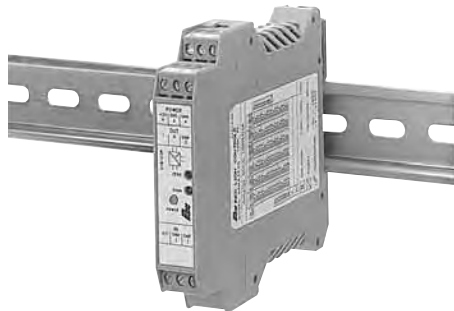


## MODEL AAMA - UNIVERSAL SIGNAL CONDITIONING MODULE



- 3-WAY ISOLATION OF ANALOG SIGNALS
- UNIVERSAL CONVERSION MODULE - INPUTS AND OUTPUTS CAN BE SELECTED VIA DIP SWITCH SETTINGS
- OVER 100 INPUT AND OUTPUT ANALOG CONVERSION COMBINATIONS
- 18 to 30 VDC MODULE POWER



### DESCRIPTION

The AAMA3535 Universal Signal Conditioning Module can isolate and convert over 100 combinations of industry standard analog signal ranges. The universal DIP switch selection feature eliminates the need to order and stock different modules for each input and output signal.

In addition to the conversion capabilities, the AAMA3535 module features an optically isolated Input/Output signal circuit and a transformer (galvanically) isolated Power to Input, Power to Output circuit.

The AAMA3535 module meets the stringent IEC 801 Standard for surge suppression, noise emission and noise immunity. The module is also CE marked for European applications.

The module's overall full scale accuracy can exceed 0.005% depending upon range selection and calibration. A hybrid SMD calibration circuit stores all range and amplification settings. The hybrid circuit maintains a very high accuracy and low drift output signal.

The module's environmental operating temperature range is -20°C to +65°C. The modular high density packaging and mounting saves time and panel space. The modules snap onto standard 35 mm flat DIN rail, and uses removable terminal blocks for easy module wiring.

### SPECIFICATIONS

1. **POWER SUPPLY VOLTAGE:** 18 to 30 VDC @ 60 mA
2. **INPUT RANGES:**

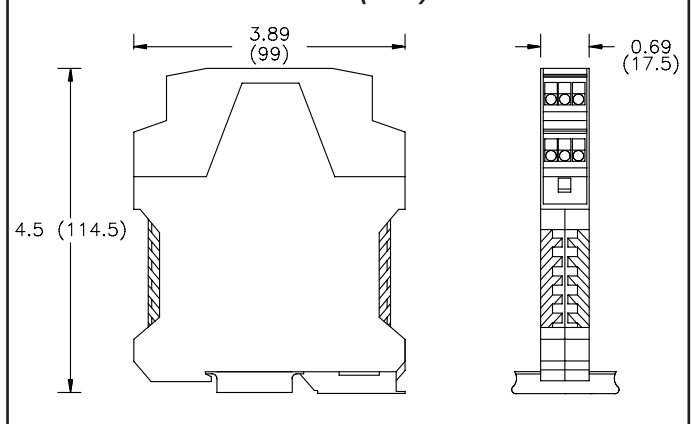
0 to 60 mV	0 to 100 mV	0 to 200 mV	0 to 300 mV	0 to 500 mV
0 to 1 V	0 to 5 V	0 to 10 V	0 to 20 V	±100 mV
±200 mV	±300 mV	±500 mV	±1 V	±2 V
±5 V	±10 V	±20 V	0 to 5 mA	0 to 20 mA
4 to 20 mA	1 to 5 V			

3. **ZERO/SPAN ADJUSTMENTS:** Range Dependent
4. **MAX. INPUT SIGNAL:**  
**Current Input:** 50 mA  
**Voltage Input:** 30 V
5. **INPUT RESISTANCE:**  
**Current:** 50 Ω  
**Voltage:** 1 MΩ
6. **INPUT PROTECTION:** Surge suppressor diodes
7. **OUTPUT RANGES:**

0 to 5 V	±5 V	0 to 10 V	±10 V
0 to 20 mA	4 to 20 mA	1 to 5 V	

8. **MAX. OUTPUT SIGNAL:**  
**Current Output:** 30 mA  
**Voltage Output:** 15 V
9. **LOAD RESISTANCE:**  
**Current Output:** ≤ 500 Ω max.  
**Voltage Output:** ≥ 5 KΩ

### DIMENSIONS In inches (mm)

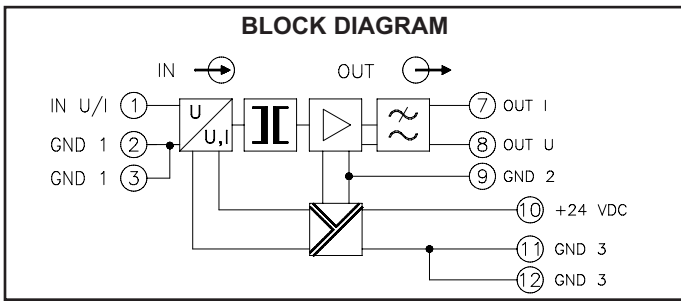


10. **ISOLATION LEVEL INPUT/OUTPUT:** 1.5 kV @ 50 Hz, 1 minute Opto Isolation
11. **POWER TO INPUT/OUTPUT:** 1.0 kV @ 50 Hz, 1 minute Transformer DC/DC
12. **MAX. INPUT FREQUENCY:** 30 Hz
13. **RESPONSE TIME:** 0.034 sec. max.
14. **OVERALL FULL SCALE ACCURACY:** 0.1% to 0.05% Dependent on Calibration Source
15. **OPERATING TEMPERATURE RANGE:** -20 to +65°C (-4 to 145°F)
16. **TEMPERATURE COEFFICIENT:** 100 ppm/K
17. **CONSTRUCTION:** Case body is green, high impact plastic
18. **CONNECTIONS:** 14 AWG wire max.
19. **MOUNTING:** Standard DIN Top hat (T) profile rail according to EN50022 - 35 x 7.5 and 35 x 15
20. **WEIGHT:** 3.76 oz (106.59 g)

### ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
AAMA	Universal Signal Conditioning	AAMA3535

The AAMA3535 module is ordered nonconfigured, allowing the user the flexibility to select their input and output signals by setting the appropriate DIP switch combination.



## INPUTS

The AAMA3535 module accepts a full range of process signal inputs and will isolate and/or convert these signals to common industrial control signals. The input and output signal combinations are configured by making specific DIP switch selections. The DIP switches can be easily accessed by pushing the side tabs and sliding the module up in the case.

## OUTPUTS

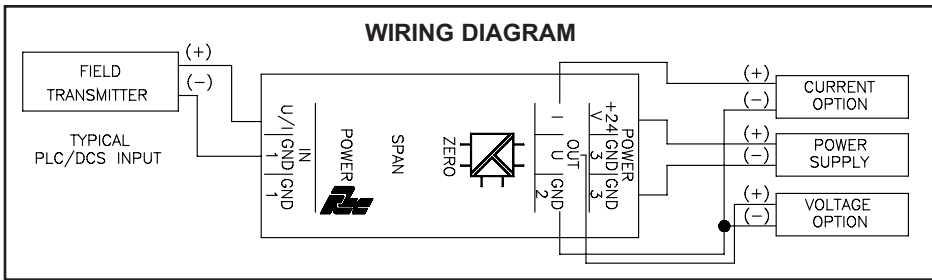
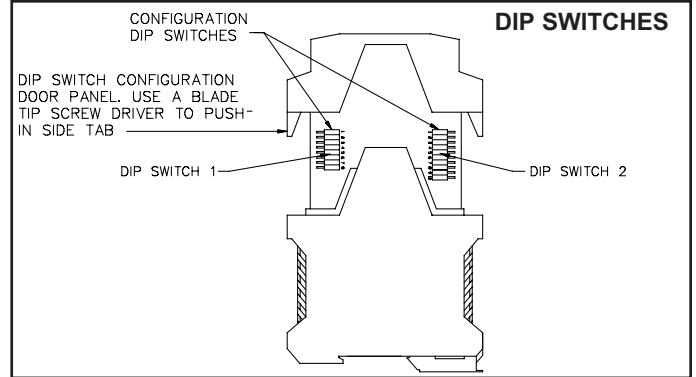
As with the input choices, the process signal outputs of the module are DIP switch selectable. The maximum output current signal is 30 mA with  $\leq 500 \Omega$  output resistance and the maximum output voltage signal is 15 V with  $\geq 5 K\Omega$  output resistance.

## MODULE ISOLATION

AAMA3535 modules feature "3-Way" Signal Isolation. The 3-Way isolation is a combination of optical and transformer isolation. The optical isolation provides common mode voltage (CMV) isolation up to 1.0 kV between the sensor input and the process signal output. The module's power is isolated from the sensor signal input and the process signal output by a DC/DC transformer isolation circuit.

## SURGE AND SHORT CIRCUIT PROTECTION

The Signal Conditioning Module is designed for use in industrial environments. Stringent IEC testing has shown that the modules pass the IEC 801.2 (Electrostatic Discharge) and IEC 801.4 (Electrical Fast Transient/Burst) tests. Suppressor diodes protect both input and output circuits from wiring errors.



## ZERO AND SPAN

The AAMA3535 module incorporates two potentiometers for adjusting separate zero and span settings. The module provides a  $\pm 5\%$  zero and span fine calibration adjustment. To use this calibration feature, the zero point should be set first, by adjusting the potentiometer labeled ZERO. Adjusting the Zero reference will proportionally offset the output range. After the Zero has been set, adjusting the SPAN potentiometer will change the signal gain.

## INPUT/OUTPUT DIP SWITCH SELECTION TABLES

### DIP SWITCH SELECTIONS FOR 0-5 VOLT OUTPUT

Input	DIP SWITCH 2										DIP SWITCH 1								Input
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	
0-60 mV			ON			ON						ON				ON	ON	ON	0-60 mV
0-100 mV			ON			ON						ON					ON		0-100 mV
0-200 mV			ON			ON							ON				ON		0-200 mV
0-300 mV			ON			ON							ON				ON		0-300 mV
0-500 mV			ON			ON							ON				ON		0-500 mV
0-1 V			ON			ON							ON				ON		0-1 V
0-2 V			ON			ON							ON				ON		0-2 V
0-5 V			ON			ON							ON						0-5 V
0-10 V			ON			ON							ON						0-10 V
0-20 V			ON			ON								ON					0-20 V
$\pm 60$ mV		ON		ON			ON						ON			ON	ON	ON	$\pm 60$ mV
$\pm 100$ mV		ON		ON			ON						ON			ON	ON	ON	$\pm 100$ mV
$\pm 200$ mV		ON		ON			ON						ON			ON	ON	ON	$\pm 200$ mV
$\pm 300$ mV		ON		ON			ON						ON			ON	ON	ON	$\pm 300$ mV
$\pm 500$ mV		ON		ON			ON						ON			ON	ON	ON	$\pm 500$ mV
$\pm 1$ V		ON		ON			ON						ON			ON	ON	ON	$\pm 1$ V
$\pm 2$ V		ON		ON			ON						ON			ON	ON	ON	$\pm 2$ V
$\pm 5$ V		ON		ON			ON						ON			ON	ON	ON	$\pm 5$ V
$\pm 10$ V		ON		ON			ON						ON			ON	ON	ON	$\pm 10$ V
$\pm 20$ V		ON		ON			ON							ON		ON	ON	ON	$\pm 20$ V
0-5 mA			ON			ON						ON			ON	ON	ON	ON	0-5 mA
0-20 mA			ON			ON						ON			ON	ON	ON	ON	0-20 mA
4-20 mA												ON			ON	ON	ON	ON	4-20mA
1-5 V												ON			ON	ON	ON	ON	1-5 V

Note: Blank space = DIP switch OFF.

### DIP SWITCH SELECTIONS FOR 0-10 VOLT OUTPUT

Input	DIP SWITCH 2										DIP SWITCH 1								Input
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	
0-60 mV			ON		ON	ON							ON			ON	ON	ON	0-60 mV
0-100 mV			ON		ON	ON							ON				ON		0-100 mV
0-200 mV			ON		ON	ON							ON				ON		0-200 mV
0-300 mV			ON		ON	ON							ON			ON		ON	0-300 mV
0-500 mV			ON		ON	ON							ON			ON			0-500 mV
0-1 V			ON		ON	ON							ON			ON			0-1 V
0-2 V			ON		ON	ON							ON		ON				0-2 V
0-5 V			ON		ON	ON							ON						0-5 V
0-10 V			ON		ON	ON							ON						0-10 V
0-20 V			ON		ON	ON								ON					0-20 V
±60 mV		ON		ON	ON		ON						ON			ON	ON	ON	±60 mV
±100 mV		ON		ON	ON		ON						ON				ON		±100 mV
±200 mV		ON		ON	ON		ON						ON				ON		±200 mV
±300 mV		ON		ON	ON		ON						ON			ON		ON	±300 mV
±500 mV		ON		ON	ON		ON						ON			ON			±500 mV
±1 V		ON		ON	ON		ON						ON			ON			±1 V
±2 V		ON		ON	ON		ON						ON		ON				±2 V
±5 V		ON		ON	ON		ON						ON						±5 V
±10 V		ON		ON	ON		ON						ON						±10 V
±20 V		ON		ON	ON		ON							ON					±20 V
0-5 mA			ON		ON	ON					ON			ON		ON	ON	ON	0-5 mA
0-20 mA			ON		ON	ON					ON		ON			ON			0-20 mA
4-20 mA					ON				ON		ON		ON			ON			4-20 mA
1-5 V					ON				ON		ON		ON						1-5 V

Note: Blank space = DIP switch OFF.

### DIP SWITCH SELECTIONS FOR ±5 VOLT OUTPUT

Input	DIP SWITCH 2										DIP SWITCH 1								Input
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	
0-60 mV	ON		ON					ON	ON	ON		ON				ON	ON	ON	0-60 mV
0-100 mV	ON		ON					ON	ON	ON		ON					ON		0-100 mV
0-200 mV	ON		ON					ON	ON	ON			ON				ON		0-200 mV
0-300 mV	ON		ON					ON	ON	ON			ON			ON		ON	0-300 mV
0-500 mV	ON		ON					ON	ON	ON		ON				ON			0-500 mV
0-1 V	ON		ON					ON	ON	ON			ON			ON			0-1 V
0-2 V	ON		ON					ON	ON	ON						ON			0-2 V
0-2 V	ON		ON					ON	ON	ON			ON	ON					0-2 V
0-5 V	ON		ON					ON	ON	ON									0-5 V
0-10 V	ON		ON					ON	ON	ON				ON					0-10 V
0-20 V	ON		ON					ON	ON	ON					ON				0-20 V
±60 mV			ON			ON						ON				ON	ON	ON	±60 mV
±100 mV			ON			ON						ON					ON		±100 mV
±200 mV			ON			ON							ON				ON		±200 mV
±300 mV			ON			ON							ON			ON		ON	±300 mV
±500 mV			ON			ON						ON				ON			±500 mV
±1 V			ON			ON							ON			ON			±1 V
±2 V			ON			ON							ON		ON				±2 V
±5 V			ON			ON							ON						±5 V
±10 V			ON			ON							ON						±10 V
±20 V			ON			ON								ON					±20 V
0-5 mA	ON		ON					ON	ON	ON	ON			ON		ON	ON	ON	0-5 mA
0-20 mA	ON		ON					ON	ON	ON	ON		ON			ON			0-20 mA
4-20 mA	ON							ON	ON	ON	ON		ON			ON			4-20 mA
1-5 V	ON							ON	ON	ON	ON		ON						1-5 V

Note: Blank space = DIP switch OFF.

### DIP SWITCH SELECTIONS FOR 1-5 VOLT OUTPUT

Input	DIP SWITCH 2										DIP SWITCH 1								Input
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	
0-60 mV	ON			ON											ON	ON	ON	0-60 mV	
0-100 mV	ON			ON												ON		0-100 mV	
0-200 mV	ON			ON									ON			ON		0-200 mV	
0-300 mV	ON			ON									ON			ON		0-300 mV	
0-500 mV	ON			ON								ON			ON			0-500 mV	
0-1 V	ON			ON									ON		ON			0-1 V	
0-2 V	ON			ON									ON		ON			0-2 V	
0-5 V	ON			ON														0-5 V	
0-10 V	ON			ON									ON					0-10 V	
0-20 V	ON			ON										ON				0-20 V	
0-5 mA	ON			ON							ON			ON	ON	ON		0-5 mA	
0-20 mA	ON			ON							ON		ON		ON			0-20 mA	
4-20 mA			ON			ON					ON		ON		ON			4-20 mA	
1-5 V			ON			ON							ON					1-5 V	

Note: Blank space = DIP switch OFF.

### DIP SWITCH SELECTIONS FOR ±10 VOLT OUTPUT

Input	DIP SWITCH 2										DIP SWITCH 1								Input
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	
0-60 mV	ON		ON		ON			ON	ON	ON		ON			ON	ON	ON	0-60 mV	
0-100 mV	ON		ON		ON			ON	ON	ON		ON				ON		0-100 mV	
0-200 mV	ON		ON		ON			ON	ON	ON			ON			ON		0-200 mV	
0-300 mV	ON		ON		ON			ON	ON	ON			ON			ON		0-300 mV	
0-500 mV	ON		ON		ON			ON	ON	ON		ON			ON			0-500 mV	
0-1 V	ON		ON		ON			ON	ON	ON			ON		ON			0-1 V	
0-2 V	ON		ON		ON			ON	ON	ON			ON		ON			0-2 V	
0-5 V	ON		ON		ON			ON	ON	ON			ON					0-5 V	
0-10 V	ON		ON		ON			ON	ON	ON			ON					0-10 V	
0-20 V	ON		ON		ON			ON	ON	ON				ON				0-20 V	
±60 mV			ON		ON	ON						ON			ON	ON	ON	±60 mV	
±100 mV			ON		ON	ON						ON				ON		±100 mV	
±200 mV			ON		ON	ON							ON			ON		±200 mV	
±300 mV			ON		ON	ON							ON		ON		ON	±300 mV	
±500 mV			ON		ON	ON						ON			ON			±500 mV	
±1 V			ON		ON	ON							ON		ON			±1 V	
±2 V			ON		ON	ON							ON		ON			±2 V	
±5 V			ON		ON	ON							ON					±5 V	
±10 V			ON		ON	ON							ON					±10 V	
±20 V			ON		ON	ON								ON				±20 V	
0-5 mA	ON		ON		ON			ON	ON	ON	ON		ON		ON	ON	ON	0-5 mA	
0-20 mA	ON		ON		ON			ON	ON	ON	ON		ON		ON			0-20 mA	
4-20 mA	ON				ON			ON	ON		ON		ON		ON			4-20 mA	
1-5 V	ON				ON			ON	ON				ON					1-5 V	

Note: Blank space = DIP switch OFF.

### DIP SWITCH SELECTIONS FOR 0-20 mA OUTPUT

Input	DIP SWITCH 2										DIP SWITCH 1								Input
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	
0-60 mV			ON		ON	ON									ON	ON	ON		0-60 mV
0-100 mV			ON		ON	ON									ON				0-100 mV
0-200 mV			ON		ON	ON											ON		0-200 mV
0-300 mV			ON		ON	ON									ON			ON	0-300 mV
0-500 mV			ON		ON	ON								ON			ON		0-500 mV
0-1 V			ON		ON	ON									ON				0-1 V
0-2 V			ON		ON	ON										ON			0-2 V
0-5 V			ON		ON	ON									ON				0-5 V
0-10 V			ON		ON	ON										ON			0-10 V
0-20 V			ON		ON	ON									ON				0-20 V
±60 mV		ON		ON	ON		ON							ON		ON	ON		±60 mV
±100 mV		ON		ON	ON		ON							ON			ON		±100 mV
±200 mV		ON		ON	ON		ON							ON			ON		±200 mV
±300 mV		ON		ON	ON		ON							ON			ON		±300 mV
±500 mV		ON		ON	ON		ON							ON			ON		±500 mV
±1 V		ON		ON	ON		ON							ON			ON		±1 V
±2 V		ON		ON	ON		ON								ON		ON		±2 V
±5 V		ON		ON	ON		ON								ON				±5 V
±10 V		ON		ON	ON		ON								ON				±10 V
±20 V		ON		ON	ON		ON									ON			±20 V
0-5 mA			ON		ON	ON						ON			ON	ON	ON		0-5 mA
0-20 mA			ON		ON	ON						ON			ON				0-20 mA
4-20 mA					ON				ON			ON			ON				4-20 mA
1-5 V					ON				ON					ON					1-5 V

Note: Blank space = DIP switch OFF.

### DIP SWITCH SELECTIONS FOR 4-20 mA OUTPUT

Input	DIP SWITCH 2										DIP SWITCH 1								Input
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	
0-60 mV	ON			ON	ON								ON			ON	ON	ON	0-60 mV
0-100 mV	ON			ON	ON								ON				ON		0-100 mV
0-200 mV	ON			ON	ON								ON				ON		0-200 mV
0-300 mV	ON			ON	ON								ON			ON		ON	0-300 mV
0-500 mV	ON			ON	ON								ON			ON			0-500 mV
0-1 V	ON			ON	ON								ON			ON			0-1 V
0-2 V	ON			ON	ON									ON		ON			0-2 V
0-5 V	ON			ON	ON									ON					0-5 V
0-10 V	ON			ON	ON										ON				0-10 V
0-20 V	ON			ON	ON											ON			0-20 V
0-5 mA	ON			ON	ON							ON			ON	ON	ON		0-5 mA
0-20 mA	ON			ON	ON							ON			ON				0-20 mA
4-20 mA			ON		ON	ON						ON			ON				4-20 mA
1-5 V			ON		ON	ON								ON					1-5 V

Note: Blank space = DIP switch OFF.

## CALIBRATION PROCEDURE

Module accuracy is dependent upon your calibration reference. The higher your calibration source accuracy, the lower the overall signal conditioner conversion error.

### CALIBRATION OF MODULES WITH 0 to 5 V, 0 to 10 V

Output adjustment of the 0 to 5 V or 0 to 10 V range:

1. Set DIP switches as shown in the DIP switch selection Tables.
2. Apply power, and let the unit stabilize for 5 minutes.
3. Set up output adjustment:
  - a. Apply low scale input range value; adjust zero pot for 0 V, ±0.5 mV.
  - b. Finally, apply full scale input from calibration source; adjust span pot for full scale ±0.5 mV.

### CALIBRATION OF MODULES WITH ±5 V, ±10 V, 1 to 5 V, 4 to 20 mA OR 0 to 20 mA

Output adjustment of ±5 V, ±10 V, 1 to 5 V, 4 to 20 mA or 0 to 20 mA ranges:

1. Set DIP switches as shown in the DIP switch selection Tables.
2. Apply power, and let the unit stabilize for 5 minutes.

3. Set up output adjustment:

- a. Apply low scale input range value from calibration source; record output as MV1. (If using 0 to 20 mA output range, apply 2 mA for low scale input value.)

- b. Apply full scale input from calibration source; record output as MV2.

4. With full scale input value still applied:

- a. First calculate the span pot adjustment point "A" using the formula:  
 $A = MV2 \times \text{constant} / (MV2 - MV1)$ . Adjust the span pot for value "A", plus or minus the adjustment tolerance. (See below table for constant and tolerance.)

- b. Finally, adjust the zero pot for the nominal full scale output value, plus or minus the adjustment tolerance.

The Constants and Adjustment Tolerances are as follows:

INPUT RANGE	CONSTANT	ADJUSTMENT TOLERANCE
±5 V	10 V	±0.5 mV
±10 V	20 V	±0.5 mV
1 to 5 V	4 V	±1 mV
0 to 20 mA	18 mA	±1 µA
4 to 20 mA	16 mA	±1 µA