

**FEATURES**

- Linear operation
- 12A/ 250VAC contacts
- Single-turn or multi-turn adjustment pots
- Jumper selectable input
- LED relay position indication

**APPLICATIONS**

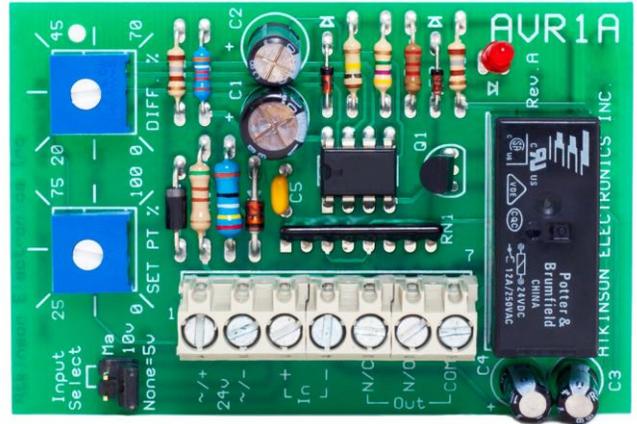
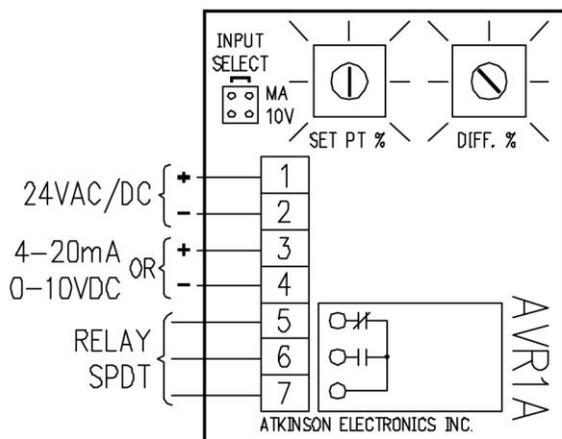
- Analog to on/off conversion
- Differential control
- Analog signal alarms
- Low/ high limit set points

**DESCRIPTION & OPERATION**

The AVR1A is an adjustable differential and trip point voltage or current sensitive relay. The relay output has SPDT contacts. It will accept a 4-20mA or 0-10VDC signal. The AVR1A can be used in applications where an analog signal needs to switch two-position loads such as circulating pumps, recirculating fans, high/low fan speeds, humidifiers, etc.

The AVR1A is powered by a 24VAC or DC supply. The input signal is fed through two stages of op-Amps where the trip point and differential settings are set. Two single or multi-turn pots are used to calibrate the trip point and differential. An LED indicates when the relay is engaged. Calibration of the AVR1A is quite simple, with both pots turned to their maximum settings (clockwise for single turn pots or counter clockwise for multi turn pots), set the input signal to the desired turn on point and adjust the trip point pot until the relay is engaged indicated by the LED. Then adjust the input to the desired trip out point and adjust the span pot until the relay turns off.

**WIRING CONFIGURATION**



**SPECIFICATIONS**

SIZE:	3”L x 2”W x 1.25”H
MOUNTING:	3” RDI SnapTrack (supplied)
POWER:	24VAC ± 10%, 50/60Hz, 1.8VA 24VDC 1.5VA
INPUT SIGNALS:	0-5VDC non-isolated 0-10VDC non-isolated 4-20mA non-isolated
INPUT IMPEDANCE:	≥100KΩ 0-5VDC ≥20KΩ 0-10VDC ≥250Ω 4-20mA
ACTION:	Make on voltage/ current rise Brake on voltage/ current drop
SET POINT:	10-100% of input
DIFFERENTIAL:	5-100% of input
AMBIENT TEMPERATURE:	0-50°C
RELAY CONTACT:	SPDT 12 Amp continuous 250VAC maximum voltage Mechanical life > 30 million ops

**ORDERING INFORMATION**

**AVR1A/SEL/X**



**ORDERING CODE EXAMPLES**

- AVR1A/S Adjustable voltage/current relay with signal turn trip point potentiometers.
- AVR1A/M Adjustable voltage/current relay with multi turn trip point potentiometers.

**STANDARD ONBOARD INPUT OPTIONS**

0-5VDC	No jumper
0-10VDC	Jumper 10V
4-20mA	Jumper mA

**SET POINT ADJUSTMENT OPTIONS**

S	Single-turn potentiometer adjustments
M	Multi-turn potentiometer adjustments

**STANDARD POWER SUPPLY OPTIONS**

AC	24VAC 610% 50/60 Hz 1.8VA
DC	24VDC 65% 1.5VA

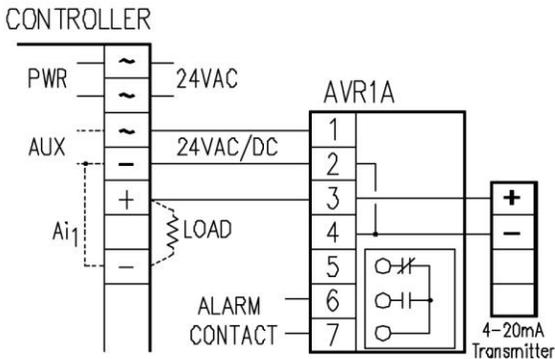
**RELAY OUTPUT SPECIFICATIONS**

Relay type:	Schrack # RTB14024 24VDC
Contact type:	1 Form C
Contact rating:	12 Amp @ 30VDC resistive 12 Amp @ 120V, 250VAC resistive
Contact material:	AgCdO
Min electrical life:	> 250k operations (12A, 250VAC)
Min mechanical life:	> 30 million operations
Dielectric Strength:	4000VAC coil/ contact

**TERMINAL BLOCK SPECIFICATIONS**

Terminal type:	Wieland # 25.163.0753.0
Connection type:	Screw-cage clamp
Connection rating:	UL: 20 Amp 12-20 AWG 300VAC CSA: 25 Amp 12-22 AWG 300VAC

**APPLICATION 1  
4 TO 20MA INPUT OPTIONS**

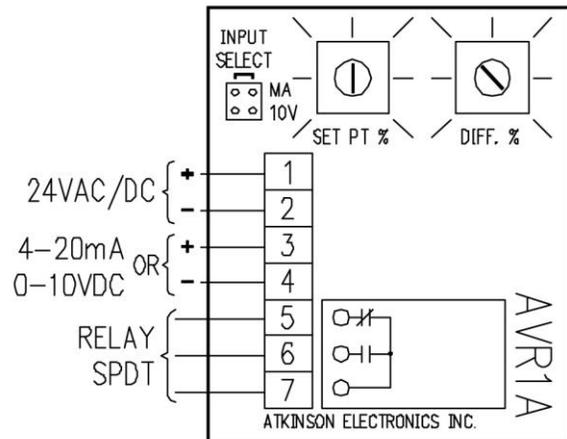


The AVR1A is powered from the controllers AUX power output. *Power supply note: AVR1A's terminal 2 is common to the input, and the AUX is common to the controllers.* The 4-20mA signal is fed into the AVR1A where a 249 Ω ½ watt resistor provides the load to produce a 1-5VDC signal which both the AVR1A and the controller uses. If the jumper on the AVR1A is left open and external 249 Ω load resistor should then be connected across the controllers input to (-) common.

**CALIBRATION ADJUSTMENTS**

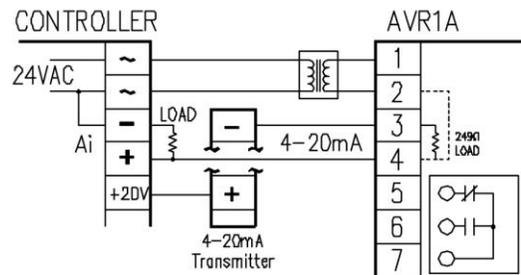
Calibration of the AVR1A is quite simple. With both pots turned to their maximum settings (clockwise), set the input signal to the desired turn on point and adjust the set point pot until the relay is engaged indicated by the LED. Then adjust the input to the desired trip out point and adjust the span pot until the relay turns off.

**TYPICAL SENSOR APPLICATION**



The AVR1A uses a half-wave bridge rectifier, term #2 of AC line is connected to input common term #4. If your output common is not common to one side of the 24VAC line then an isolation transformer is *RECOMMENDED* to avoid ground loop problems.

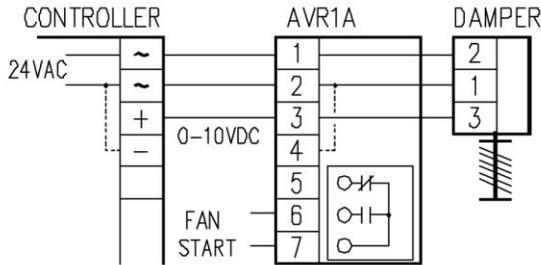
**APPLICATION 2  
SERIES 4 TO 20MA INPUTS**



The AVR1A is powered from an isolation transformer so that the input commons (-) of both devices, are isolated from each other. This allows the inputs of two devices to be connected in series, otherwise the second input in the loop would be shorted.

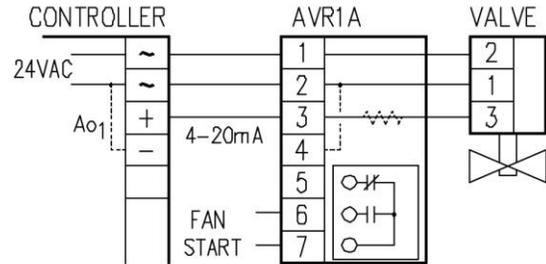
# ADJUSTABLE VOLTAGE SENSITIVE RELAY AVR1A

## APPLICATION 3 0 TO 10VDC INPUT SIGNAL



The AVR1A is powered from the same 24VAC as the controller. (Power supply note: Both the AVR1A's input common (-) and the Controller's output common (-) share one side of the 24VAC line). The 0-10VDC signal is fed into the AVR1A's input and out to the damper motor's input as a three wire connection.

## APPLICATION 4 4 TO 20MA INPUT SIGNAL



The AVR1A is powered from the same 24VAC as the controller. (Power supply note: Both the AVR1A's input common (-) and the controller's output common (-) share one side of the 24VAC line). The 4-20mA signal is fed into the AVR1A's input and out to the valve's input as a three wire connection. If the valves input impedance is less than 250V then an additional load resistor is added between to AVR1A and the valve. This provides a total voltage drop of 1-5VDC to drive the AVR1A's input.

## APPLICATIONS AND INSTALLATION INSTRUCTIONS

Calibration of the AVR1A/M is quite simple. With the set-point and differential pots adjusted full counter clockwise, set the input signal to the desired turn on point and adjust the set-point pot clockwise until the relay is engaged indicated by the LED. Then adjust the input to the desired trip out point and adjust the differential pot until the relay turns off.

Note:

1. The set-point and differential pots on the AVR1A/M are a 20 turn pot and adjust backwards to the single turn version.
2. The Multi-turn version has voltage test points for the two pots. Tp1 can be used to preset the trip on point of the AVR1A. Its voltage corresponds to the input voltage (0-5V) as the trip point. Tp2 only has a voltage present when the relay is engaged, and its voltage varies as to where the trip on point is set.
3. The AVR1A/M differential setting can be set as narrow as: 0.125VDC on the 5 Volt input, 0.250VDC on the 10 volt input or 0.5mA on the 4-20mA input, or as wide as the full input signal.

The table provides the approximate voltage settings for Tp1 of the corresponding trip on voltage settings.

0 to 5VDC input	0 to 10VDC input	4 to 20mA input	Tp1 VDC
1 VDC	2 VDC	4 mA **	1.05 VDC
1.5VDC	3 VDC	6 mA	1.50 VDC
2 VDC	4 VDC	8 mA	1.95 VDC
2.5VDC	5 VDC	10mA	2.45 VDC
3 VDC	6 VDC	12mA	3.00 VDC
3.5VDC	7 VDC	14mA	3.46 VDC
4 VDC	8 VDC	16mA	3.95 VDC
4.5VDC	9 VDC	18mA	4.40 VDC
5 VDC	10VDC	20mA	4.90 VDC