

FEATURES

- ❖ Linear operation
- ❖ 12A/250V AC 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

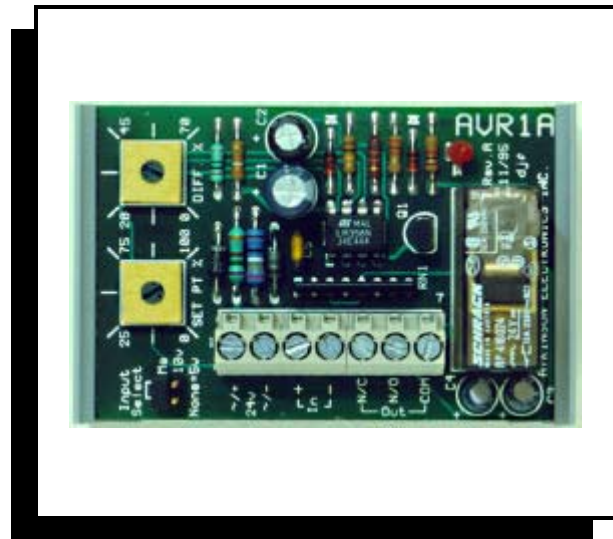
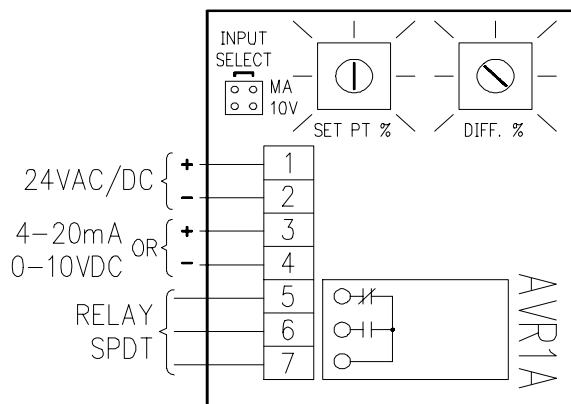
DESCRIPTION

The AVR1A is an adjustable differential and trip point voltage or current sensitive relay. The relay output has SPDT contacts (see next page for specifications). It will accept a 4 to 20mA or 0 to 10V DC 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.

OPERATION

The AVR1A is powered by a 24V AC 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

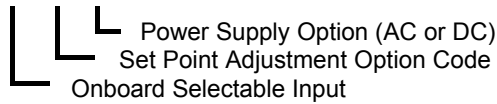


SPECIFICATIONS

SIZE:	3" L x 2" W x 1.25" H
MOUNTING:	3" RDI snap-track (supplied)
POWER:	24V AC \pm 10% 50/60Hz 1.8VA 24V DC 1.5VA
INPUT SIGNALS:	0-5V DC non-isolated 0-10V DC non-isolated 4-20mA non-isolated
INPUT IMPEDANCE:	\geq 100K Ω 0-5V DC, \geq 20K Ω 0-10V DC, \geq 250 Ω 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 TEMP:	0-50°C
RELAY CONTACT:	SPDT 12 amp continuous, 250V AC maximum voltage, Mechanical life >30 million ops.

ORDERING INFORMATION

AVR1A/SEL/X/XX



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 (Standard)
- M - Multi-turn potentiometer adjustments

POWER SUPPLY OPTIONS

- AC - 24VAC ± 10% 50/60 Hz 1.8VA
- DC - 24VDC ± 5% 1.5VA

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.

RELAY OUTPUT SPECIFICATIONS

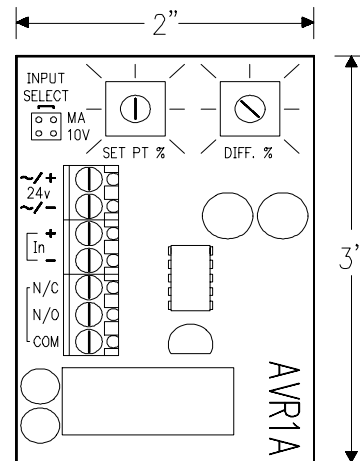
Relay type:	Schrack # RTB14024 24V DC
Contact type.:	1 Form C
Contact rating:	12 Amp @ 30V DC resistive 12 Amp @ 120V, 250V AC resistive
Contact material:	AgCdO
Min electrical life:	> 250k operations (12A,250V AC)
Min mechanical life:	> 30 million operations
Dielectric Strength:	4000V AC coil/contact

TERMINAL BLOCK SPECIFICATIONS

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

Call for other calibration ranges and versions.

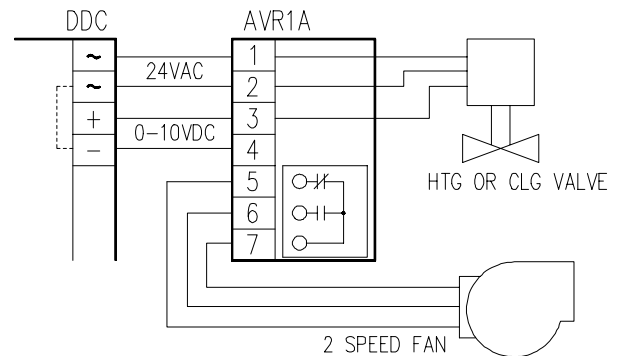
PHYSICAL CONFIGURATION



CALIBRATION ADJUSTMENTS

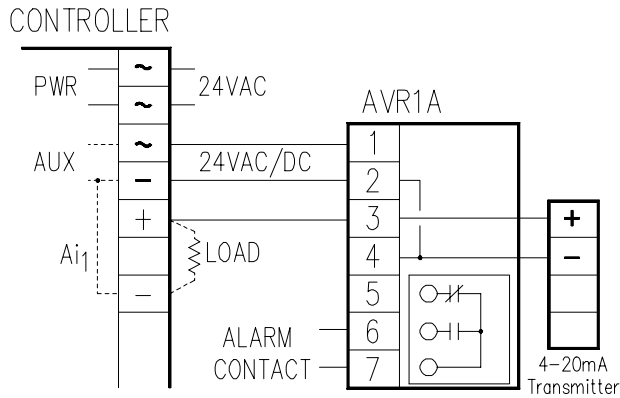
Calibration of the AVR1A is quite simple. With both pots turned to their maximum settings (clockwise), set the input signal to the desired turn on point and adjust the set point pot until the relay is engaged indicated by the LED. Then adjust the input to the desired trip out point and adjust the span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

TYPICAL APPLICATION



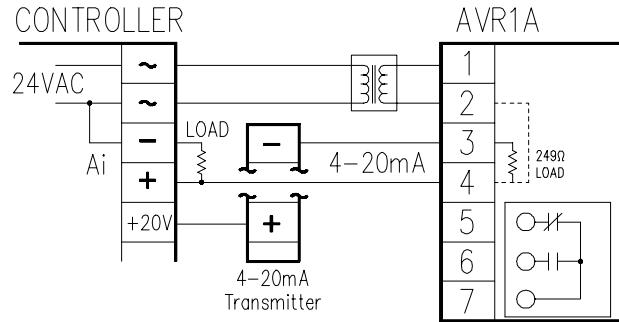
The AVR1A uses a half-wave bridge rectifier, term #2 of AC line is connected to input common term #4. If your output common is not common to one side of the 24V AC line then an isolation transformer is RECOMMENDED to avoid ground loop problems.

APPLICATION - 1 4 to 20mA INPUT OPTIONS



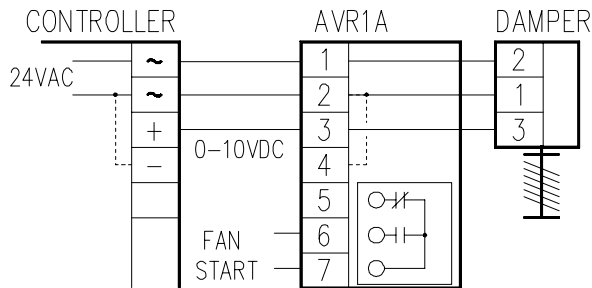
The AVR1A is powered from the controllers AUX power output. (Power supply note: AVR1A's terminal 2 is common to the input - and the aux - is common to the controllers). The 4-20mA signal is fed into the AVR1A where a 249Ω ½ watt resistor provides the load to produce a 1 to 5V DC signal which both the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

APPLICATION - 2 SERIES 4 to 20mA INPUTS



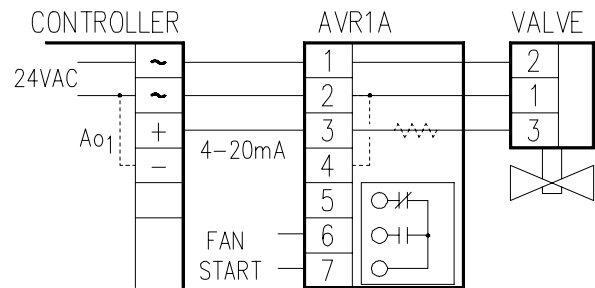
The AVR1A is powered from an isolation transformer so that the input commons (-) of both devices, are isolated from each other. This allows the inputs of two devices to be connected in series, other wise the second input in the loop would be shorted. Note: the AVR1A uses a 249Ω load resistor and the controller could also be using 249Ω load, thus your 4-20mA transmitter must be able to source a 500Ω load.

APPLICATION - 3 0 to 10V DC INPUT SIGNAL



The AVR1A is powered from the same 24V AC as the controller. (Power supply note: Both the AVR1A's input common (-) and the Controller's output common (-) share one side of the 24V AC line). The 0-10V DC 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 24V AC as the controller. (Power supply note: Both the AVR1A's input common (-) and the Controller's output common (-) share one side of the 24V AC 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 250Ω then an additional load resistor is added between to AVR1A and the valve. This provides a total voltage drop of 1 to 5V DC to drive the AVR1A's input.

Call for other calibration ranges and versions.

CALIBRATION ADJUSTMENTS FOR MULTI -TURN POT VERSION

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 it's 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 5Volt input, 0.250VDC on the 10Volt input or 0.5mA on the 4-20mA input, or as wide as the full input signal.

The following table provides the approximate voltage settings for Tp1 for 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