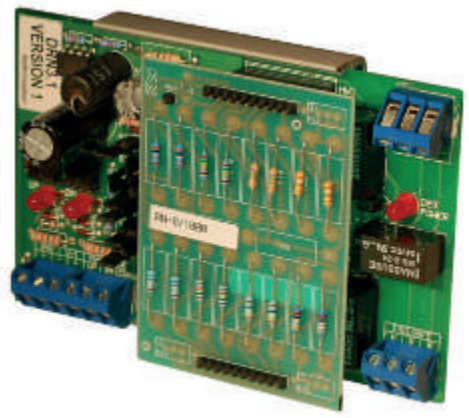
AX-ROM
Resistance Output Modules



Product overview

The AX-ROM135 and the AX-ROM1000 Modules enable an Analogue, Pulse or Floating point signal and convert to either a 0-135Ω or a 1KΩ Proportional Resistive output signal. The output resistance signal does not wrap around if the input signal exceed the highest or lowest selected input value. Both units are powered from 24Vac or 24Vdc, feature LED indication and are designed for mounting on TS35 section DIN rail. Three versions of the unit are available and must be selected at time of order.

Features

- 135Ω & 1kΩ output versions (other values also)
- Analogue, pulse or floating point inputs
- 24Vac/dc powered
- DIN Rail mounting (TS35)
- High quality rising clamp terminals
- LED indication

Product specifications

Input Signal:	8 Analogue (current/voltage) signal ranges
	6 Selectable pulse input ranges
	6 Selectable floating point ramp rates
Output:	135Ω and 1kΩ (Electrically isolated)
Power Supply:	24Vac/dc
Power Consumption:	250mA max
Terminals:	Rising clamp 0.5-2.5mm² cable
LED Indication:	ON when power on
Ambient Temperature Range:	0 to 50˚C
Dimensions:	120mm x 80mm x 25mm (approx.)
Country of Origin:	U.S.A.

Order codes

AX-ROM135	135Ω Resistance Output Module
AX-ROM1K	1kΩ Resistance Output Module

For all units, specify the following A B C D

A = Beginning resistance value
B = End resistance value
C = Wattage
D = Version 1, 2 or 4 (see page 2)

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Requirements

Input:

Source	Relay contact closure, transistor, or triac
Trigger Level	4.5 to 30 volts DC, 10 to 26.4 volts AC

Pulse Ranges: (Custom pulse ranges available also)

Off Time	80 milliseconds minimum
Version 1	0.02 to 5 seconds / 0.02 second increments
	0.1 to 25.5 seconds / 0.1 second increments
	0.59 to 2.93 seconds / 0.01 second increments
Version 2	0.1 to 10 seconds
	0.023 to 6 seconds
Version 4	0-10 second Duty Cycle Pulse (samples in a 10 second window)
Impedance	750 Ohms nominal

Floating Point: (Custom rates of change available also)

Rates of change	Version #1:	30, 60 and 90 sec.
	Version #2:	45, 120 and 240 sec.
	Impedance	750 ohms nominal

Analog:

Ranges - Version 1 & 2		0-5Vdc or 1-5Vdc
		0-15Vdc or 3-15Vdc
		0-10Vdc or 2-10Vdc
		0-20mA or 4-20mA
Impedances	Voltage	10,000 Ohms
	Current	250 Ohms

Output:

Resolution	256 steps (no wrap around).

Mechanical Requirements

Relay Contacts:

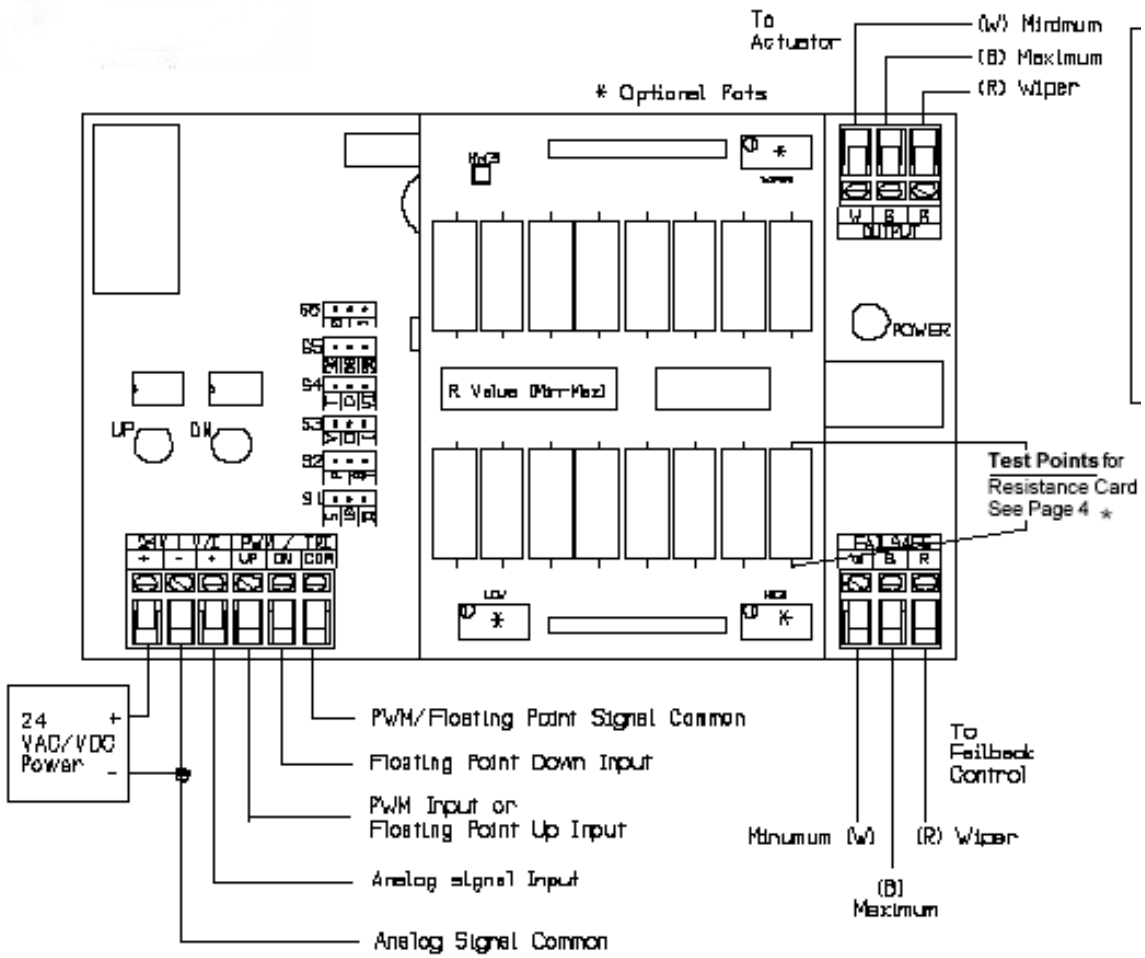
Type	Form C, Gold-clad Silver
Rating	2 amp max. Resistive @ 24V
Electrical Life	100,000 operations
Mechanical Life	10 million operations

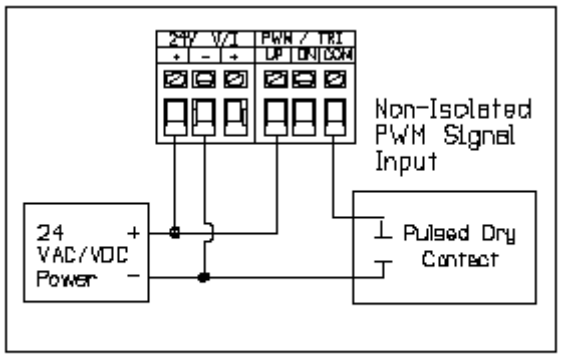
STANDARD RESISTOR NETWORKS

ROM - 0/135-3 watts (±5%)
ROM - 0/1000-1/4 watt (±5%)

STANDARD RESISTOR NETWORKS

ROM - 0/270-3 watts (±5%)
ROM - 0/500 - 1/4 watt (±5%)
ROM - 0/1500 -1/4 watt (±5%)
ROM - 0/2K - 1/4 watt (±5%)
ROM - 0/4K - 1/4 watt (±5%)
ROM - 0/5K - 1/4 watt (±5%)
ROM - 0/10K - 1/4 watt (±5%)
ROM - 0/20K - 1/4 watt (±5%)
ROM - 0/40K - 1/4 watt (±5%)





Non-Isolated PWM Signal Input

JUMPER SETTINGS - ANALOG
Uses same Version #1 or #2 chips
as Pulse & Floating Point programs →

INPUT	S1	S2	S3	S4	S5	S6
0-5v						
0-10v						
0-15v						
1-5v						
2-10v						
3-15v						
0-20mA						
4-20mA						

JUMPER SETTINGS - DUTY CYCLE PULSE
Version #4 - Chip # 0305y1a.hex

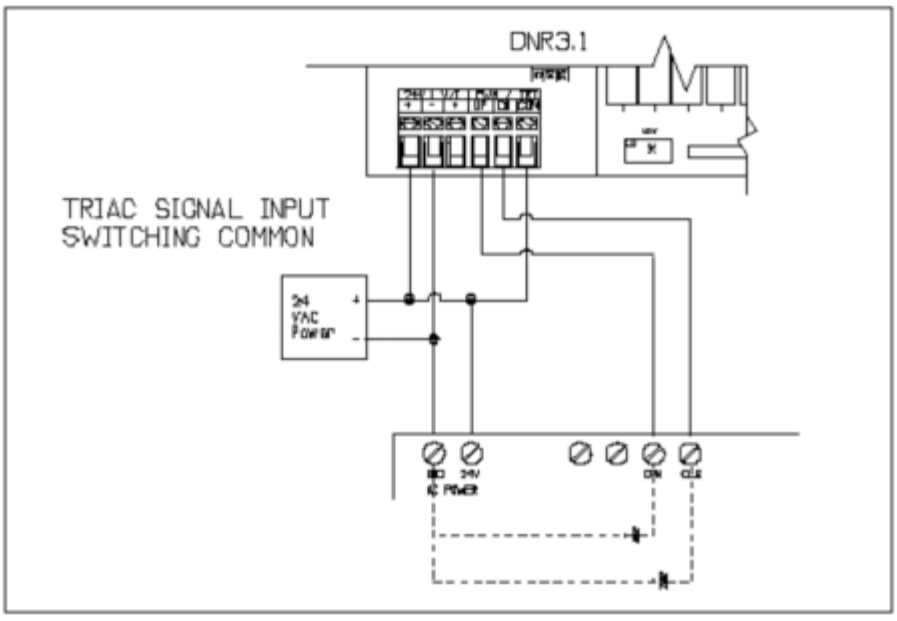
MODE	S1	S2	S3	S4	S5	S6
0-10 Second Duty Cycle Pulse						

JUMPER SETTINGS - PULSE AND FLOATING POINT
Version #1 - Chip # 0052y0h.hex

INPUT	S1	S2	S3	S4	S5	S6
0.1-25.5s pulse						
0.02-5s pulse						
0.59-2.93s pulse						
30s Floating Pt.						
60s Floating Pt.						
90s Floating Pt.						

JUMPER SETTINGS - PULSE AND FLOATING POINT
Version #2 - Chip # 0054y0b.hex

INPUT	S1	S2	S3	S4	S5	S6
.1-10s pulse						
.023-6s pulse						
45s Floating Pt.						
120s Floating Pt.						
240s Floating Pt.						



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Installation

READ THESE INSTRUCTIONS BEFORE YOU BEGIN INSTALLATION.

Ground yourself before touching board. Some components are static sensitive.

MOUNTING:

Circuit board may be mounted in any position. If circuit board slides out of snap track, a non-conductive "stop" may be required. Use only fingers to remove board from snap track. Slide out of snap track or push against side of snap track and life that side of the circuit board to remove. Do not flex board or use tools.

POWER CONNECTIONS - THIS PRODUCT ACCEPTS 24VDC OR 24VAC POWER.

Be sure to follow all local and electrical codes. Refer to wiring diagram for connection information.

Be sure to make all connections with power off.

1. DC Power - Refer to wiring diagram for connection information. If the 24Vdc power is shared with devices that have coils such as relays, solenoids, or other inductors, each coil must have a MOV, DC Transorb, or diode placed across the coil or inductor. The cathode, or banded side of the DC Transorb or diode, connects to the positive side of the power supply.

2. AC Power - Refer to wiring diagram for connection information. Check the wiring configuration of any other loads that may be connected to this transformer. If requires by BAS or controller specification, the 24Vac neutral can be earth grounded at the transformer. Analog input, digital input, and analog output circuits should not be earth grounded at two points. Any field device connected to this transformer must use the same common. If you are not sure of other field device configuration, use separate transformers for isolation. If the 24Vac power is shared with devices that have coils such as relays, solenoids, or other inductors, each coil must have an MOV, AC Transorb, or other spike snubbing device across of the shared coils. Without these snubbers, coils produce very large voltage spikes when de-energizing that can cause malfunction or destruction of electronic circuits. Refer to wiring diagram for connection information.

3. You should measure the actual voltage output of the secondary. If the output is not fully loaded you may read a higher voltage than the circuit board can handle.

CHECKOUT

Version identification: Most AX-ROM's are shipped as version #1. An IC chip on the AX-ROM is labelled with the version program number. You may have to remove the resistor network card to view and compare to table on page 1. Resistor network: Each AX-ROM requires a plug-in resistor network card (RN) to operate properly. This resistance card determines the simulated slide wire potentiometer values for the output. Insert the RN (usually in a separate package from AX-ROM) into the AX-ROM. There are two rows of pins on the RN and two rows of female connectors on the AX-ROM. See page 1 drawing for proper RN orientation.

The AX-ROM resistance output simulates a potentiometer. Terminal R is the wiper, B is the low end of the potentiometer and W is the high end. Upon power-up, the wiper will start at the B position and will remain there until the first PULSE or FLOATING POINT signal is received. The ANALOG version will begin tracking the input signal instantly after "sampling" the input signal to eliminate error. The output resistance will not change on the PULSE version until the end of the pulse. To check the resistance output, vary the input signal and measure the resistance. The resistance between terminals B and R will increase as the input signal increases and the resistance between W and R will decrease. If both floating point inputs are on for 3 seconds, the DRN3.1 resets to minimum resistance output. Setting the jumpers: Remove power from the AX-ROM. Place jumpers S1 through S6 in the appropriate positions. All six jumpers must be in proper position for each input type. Hold the AX-ROM with the label at top to orient its jumper shunts with the chart. Version #1 and Version #2 share the same analog inputs. Ramping time for floating point inputs are selectable. Version #4 accepts a continuous pulse signal command string within a 10 second window. No pulse in this 10 second window produces minimum percent output. A 10 second pulse in this 10 second window produces 100% output. Continuous pulse will produce maximum percent output. When power is restored, changes will be recognized. Apply 24Vac/dc to "PWR" terminals "+24V" and "-", the FAIL-SAFE input terminals are closed ton the OUTPUT terminals. Check for continuity. When power is applied to terminals "+24V" and "-", the POWER LED will light and the fail-safe terminals will be disconnected from the output terminals. Fail-back only occurs when the DRN3.1 has lost power. For fail-back to minimum resistance, add a jumper between B (minimum) and R (wiper) only. For fail-back to maximum resistance, add a jumper between W (maximum) and R (wiper) only. For fail-back to a specific resistance, a manual potentiometer or fixed resistors can be added between B (minimum) and R (wiper) only.

TESTING THE INPUT:

Voltage input:

Connect the "+" or positive wire to "V/I+". Connect the common to "24V-". Apply a voltage from control source. Measure voltage at "24V-" and "V/I+" at terminal block. If the commanded voltage is not present, remove the "+" or positive wire and measure from "+" wire to "24V-". If no voltage is measures check the wiring from controller. If voltage disappears or is reduced when connected to the AX-ROM, confirm input jumper is set to voltage mode and remove signal input wires and power from unit. Measure the resistance from "24V-" to "V/I+". Resistance in the voltage modes will be around 10k. If input is shorted contact our Technical Support. If not shorted remove the controller input common and connect 24Vac/dc to the AX-ROM. **Check for ground loop:** Place meter in voltage mode and measure Vac and Vdc from analog input common wire to power supply common. If any voltage is measures in DC or AC a *ground loop* most likely exists. Check power commons and/or ground potentials. Use a separate 24 volt transformer for the AX-ROM and let common float.

Current input:

Confirm the input jumper is in the correct position. Measures input resistance should be around 250 Ohms. Connect "+" or positive to "V/I+" and common or "-" to "24V-" Apply mA signal. Place meter in voltage and measure voltage across "V/I+" and "24V-" 4mA is equal to 1 volt and 20mA is equal to 5V. Use Ohms law to find voltage from current. (Current x 250 = Volts. Sample: 13mA or 0.012 x 250 = 3 volts). If no voltage is present, check wiring for open. Current cannot exist without voltage present from "V/I+" to "24V-" unless dead shorted.

Pulse Width Modulated (or PWM) input:

Apply 24Vac/dc to the PWR terminals. Connect your meter to the to the R and B terminals on the output terminal block. Set meter to resistance range of resistor network. Connect a jumper wire from UP to the 24 "+" terminal. Connect a jumper wire to the "24 -" only. You are now ready to simulate a timed pulse signal. For testing purposes, select .1 to 25.5 or 0.1-10 seconds on version 2. Be sure to reset power to allow the DRN3.1 to recognize new settings. Take the free end of the jumper wire from PWR - and connect by holding wire to the UP terminal. Count to 50% of timing range and remove. Verify the pulse UP LED indication. Voltage can be measures across the input to verify proper voltages. Read output. Has the output changed? The output should be close to 50% of set output.

Floating Point/Tri-state:

Apply 24Vac/dc to the PWR terminals. Connect your meter to the R and W terminals on the output terminal block. Set meter to resistance range of resistor network. Connect a jumper wire from Up to the 24 "+" terminal. Connect a jumper wire to the "24-" only. You are now ready to simulate a timed pulse signal. For testing purposes, select the 30 or 45 second range on version 2. Be sure to reset power to allow the AX-ROM to recognize new settings. Take the free end of the jumper wire from "PWR-" and connect by holding wire to the UP terminal. Count to 50% of timing range and remove. Verify the pulse UP LED indication. Voltage can be measures across the input to verify proper voltages. Read output. Has the output changed? The output should be close to 50% of set output. Placing the wires on the DWN "+" and "-" terminals should decrease the output signal.

Testing the output:

Measures resistance from B to R terminals is the maximum resistance the RN can output. This measurement will not change. Measured resistance from W to R will increase proportionally to the command input value. A clicking sound will occur when resistance is changed. Resistance changes in steps. Resistance range divided by 256 will be the set size. Except for version 3 where step size is selected. Command a change or simulate an input signal to change the output. Measure the resistance value. If the resistance has not changed, check settings and reset power. Verify the input is functional.

Most common problem:

The analog input from the controller can contain electrical noise. This noise is seen by the AX-ROM as a change in commanded input signal and quickly changes the output. The most common symptom is a constant chatter of the relays Standard precautions should be taken to prevent noise on the signal input of the AX-ROM (i.e. Do not run signal wiring near line voltage wiring or fluorescent light fixtures). Versions 1 and 2 of the AX-ROM were modified in 2001 to add extra filtering to the input. Time response full scale is about 6 seconds. Check version number on your AX-ROM if high speed response or extra filtered version is required contact our sales department.

TEST POINTS FOR RESISTOR NETWORK (RN) CARD

The resistor Network card does not have to be attached to the AX-ROM motherboard for this test, but if attached to the AX-ROM, you must remove power before testing. Using an Ohm meter, test the last resistor as illustrated on page . The value indicated should be 1/2 the total resistance range of the Resistor Network card.

Example:

A 500 Ohm reading indicates a 0-1000 Ohm Resistor Network card.

A 67.5 Ohm reading indicated a 0-135 Ohm Resistor Network card.