Introduction
The GT-ARES transducer is an interface that accepts an analog signal input (voltage or current) and uses that signal to proportionally control a variable resistance output. The device output simulates a three-wire slide wire or rotary potentiometer. The resistive output is electrically isolated from the input control signal.

The input signal type is DIP switch selectable to one of several factory calibrated standard ranges and the output has both ends of the potentiometer and the wiper available on the terminal connectors. The output resistance simulates a potentiometer and does not wrap around at the end points.

The GT-ARES includes a regulated power output that can be used to power a current-loop transducer and also features a failsafe input that will connect to the output terminals in case of power loss or for manual output control. There is also an LED power indicator and a manual override jumper for failsafe operation.

The product comes with standard snap-track for easy mounting or is available with various resistance values. The potentiometer may be ordered with no offset value such as 0-135 ohms, or may be configured with an offset resistance such as 20-30k ohms.

Applications
- Electric actuator control
- Electronic potentiometer
- Resistive sensor simulation

Before Installation
Read these instructions carefully before installing and commissioning the GT-ARES transducer. Failure to follow these instructions may result in product damage. Do not use in an explosive or hazardous environment, with combustible or flammable gases, as a safety or emergency stop device or in any other application where failure of the product could result in personal injury. Take electrostatic discharge precautions during installation and do not exceed the device ratings.

Mounting
The snap-track device may be mounted in any position. Use only fingers to remove the pcb from the snap-track, do not pry on the pcb with tools. Do not flex the pcb during removal or installation. Slide the pcb out of the snap-track or push against one side of the snap-track and lift the pcb out. Ensure any metallic mounting hardware does not contact the underside of the pcb.

Avoid mounting in areas where the transducer is exposed to vibrations or rapid temperature changes.

Wiring - General
Deactivate the 24 Vac/dc power supply until all connections are made to the device to prevent electrical shock or equipment damage. Follow proper electrostatic discharge (ESD) handling procedures when installing the device or equipment damage may occur.

Use 22 AWG shielded wiring for all connections and do not locate the device wires in the same conduit with wiring used to supply inductive loads such as motors. Make all connections in accordance with national and local codes.

Wiring – Power Input
Connect the plus dc or the ac voltage hot side to the **PWR** terminal. The supply common is connected to the **COM** terminal. The device is reverse voltage protected and will not operate if connected backwards. It has a half-wave power supply so the supply common is the same as the input signal common.

Several devices may be connected to one power supply and the input signals all share the same common. Use caution when grounding the secondary of a transformer or when wiring multiple devices to ensure the ground point is the same on all devices and the controller.

Ensure the supplied power is within the device ratings as shown in the *Specifications* section of this document. Power supply voltages outside the ratings may cause over-heating, device damage or un-reliable operation.

Wiring – Input Signal
The analog input signal is connected to the **IN** terminal. The input signal is referenced to the **COM** terminal. Ensure the INPUT SELECT switches are set for the correct signal type, either voltage or current. The input signal will typically come from a DDC or BAS analog output.

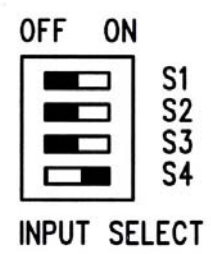
Wiring – Power Output
The **20V** terminal is a regulated power supply output which provides a 20 Vdc power supply at 30 mA maximum that can be used to operate an external sensor, for example.

Wiring – Resistance Output
The GT-ARES output simulates a potentiometer. Terminal R is the wiper, terminal W is the low end (minimum) of the pot and terminal B is the high end (maximum) of the pot.

Operation – Input and Output Signals
The input signal type is selected with the 4 position DIP switch labelled INPUT SELECT. The available input signal types and DIP switch positions are shown in the chart below.

Input Type	S1	S2	S3	S4
0-5 Vdc	OFF	OFF	OFF	ON
0-10 Vdc	OFF	ON	OFF	ON
0-15 Vdc	OFF	OFF	ON	ON
1-5 Vdc	OFF	OFF	OFF	OFF
2-10 Vdc	OFF	ON	OFF	OFF
3-15 Vdc	OFF	OFF	ON	OFF
0-20 mA	ON	OFF	OFF	ON
4-20 mA	ON	OFF	OFF	OFF

For example, two applications are shown below.



0-5 Vdc Input Type

4-20 mA Input Type

The ranges shown in the chart are all pre-calibrated such that 0-100% of the input signal will cause the output resistance from W to R to change from the pot minimum to the maximum value.

Upon power up, the wiper will start at the W position but will immediately sample the input signal and move to the resistance value proportional to the input signal and the selected input range.

For example, for a 0-5 Vdc input signal and a 0-135 ohm pot, the resistance between W (min) and R (wiper) will be 0 ohms for 0 Vdc input and the resistance between B (max) and R (wiper) will be 135 ohms. As the input signal increases from 0 to 5 Vdc, the resistance between W and R will increase and the resistance between B and R will decrease until the input signal is 5 Vdc. At 5 Vdc the W-R resistance will be 135 ohms and the B-R resistance will be 0 ohms.

The resistance output has a minimum and maximum value and does not wrap around. In the above example with 0-5 Vdc input signal, the W-R resistance will increase to 135 ohms and will stay at 135 ohms even if 6 Vdc is applied to the input.

Voltage input signals are referenced to the COM terminal and have an input impedance of >10 KΩ.

Current input signals are also referenced to COM and have an input impedance of 250 Ω. The current input is a sinking type signal, the controller must source the 0-20 mA signal.

The GT-RES features a micro-controller for highest accuracy and includes input filtering and hysteresis to prevent relay chatter or hunting for the correct output resistance value. The output resistance is controlled with a 256 bit resolution.

Operation – Failsafe Input
The GT-ARES OUTPUT terminals are connected to the resistance values through a DPDT relay that is used to control the failsafe function. During normal operation with power applied to the GT-ARES, the pot resistance is connected to the OUTPUT terminals.

In the event of a power loss, the failsafe relay will disconnect the OUTPUT terminals from the pot value and instead connect the OUTPUT terminals directly to the FAILSAFE terminals.

This is useful in several ways. For example, a discreet resistor may be connected to the W (min) and R (wiper) terminals of the FAILSAFE connector to set a minimum resistance value on power failure. If the GT-ARES is controlling a damper actuator, then the resistance would set a minimum open position on power failure.

To failsafe to the minimum GT-ARES resistance value, connect a wire jumper between the W and R terminals of the FAILSAFE connector.

To failsafe to the maximum GT-ARES resistance value, connect a wire jumper between the B and R terminals of the FAILSAFE connector.

A manual potentiometer may also be connected to the FAILSAFE connector to allow manual control. The pcb has a MAN / AUTO jumper that can be used to force the failsafe mode. For normal operation the jumper is placed in the AUTO position. To test the system, place the jumper in the MAN position and the OUTPUT terminals will immediately connect to the FAILSAFE terminals so an external pot can be used to manually control the device connected to the GT-ARES output.

Return the jumper to the AUTO position for normal operation.

General Specifications

Power Supply . . . . . 23 to 30 Vdc, 22 to 27 Vac (half-wave rectified)
Consumption . . . . . 110 mA maximum
Input Voltage Effect . . . . . Negligible over specified operating range
Protection Circuitry . . . . . Reverse voltage protected, overvoltage protected
Operating Conditions . . . . . 0 to 50 °C (32 to 122 °F), 5 to 95 %RH non-condensing
Storage Conditions . . . . . -30 to 70 °C (-22 to 158 °F), 5 to 95 %RH non-condensing
Wiring Connections . . . . . Screw terminal block (12 to 24 AWG)
Enclosure . . . . . Snap track mounting standard, 4.6” long x 3.25” wide (117 x 83 mm)
Weight . . . . . 131 gm (4.6 oz)

Power Output

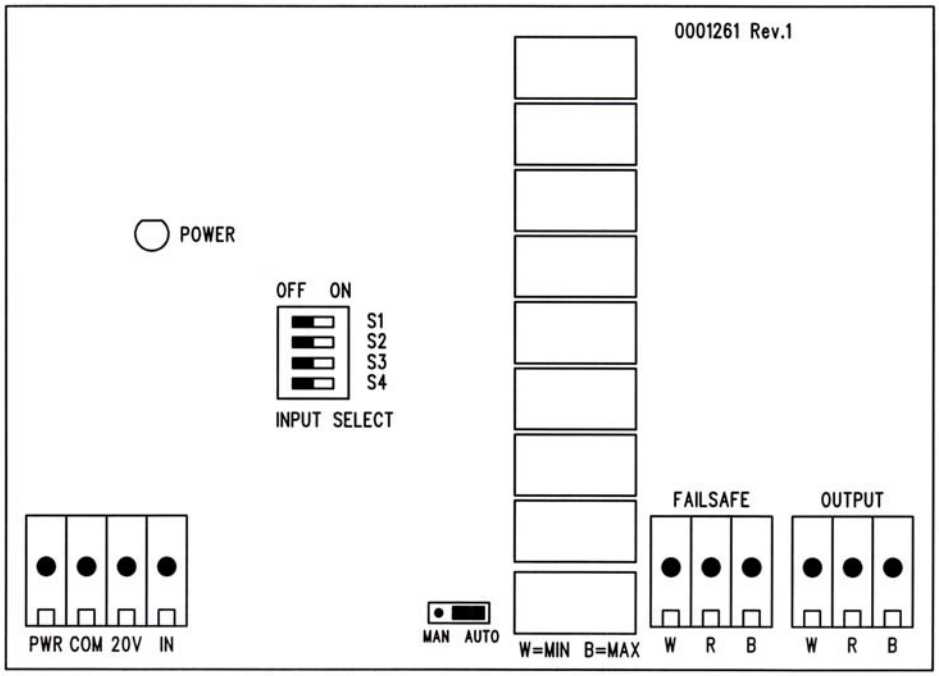
Regulated Power Output . . . . . 20 Vdc ± 10% (use to power an external sensor)
Power Output Drive . . . . . 30 mA maximum

Input Signal

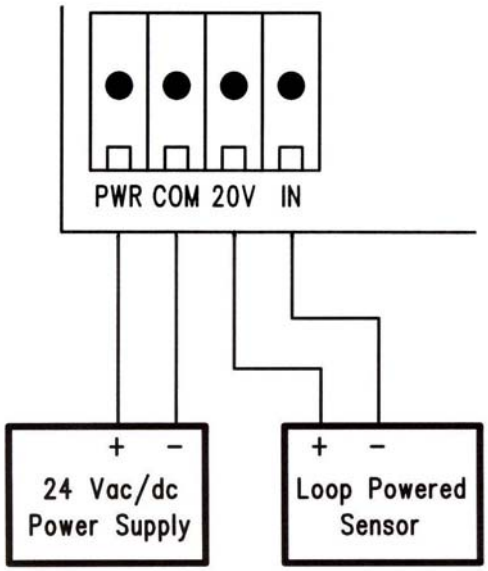
Voltage Range . . . . . 0-5, 0-10, 0-15, 1-5, 2-10 or 3-15 Vdc (switch selectable)
Voltage Impedance . . . . . > 10 KΩ
Current Range . . . . . 0-20 or 4-20 mA (switch selectable)
Current Impedance . . . . . 250 Ω

Output Signal

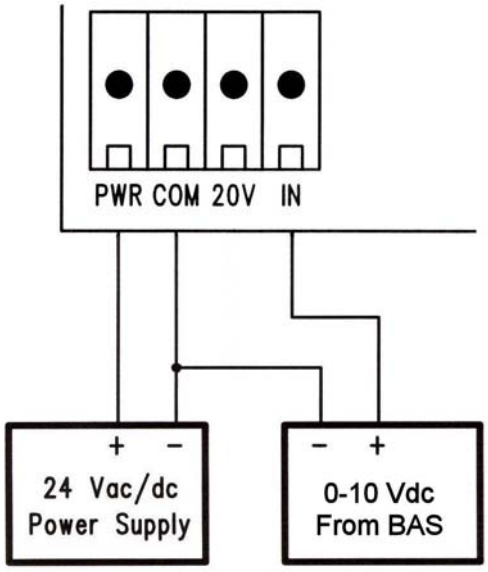
Signal Type . . . . . Simulated potentiometer resistance (3-wire)
Resolution . . . . . 256 steps (no wrap around)
Resistance accuracy . . . . . ± 5%
Standard Values . . . . . 0-135 Ω, 4.5 watts
0-270 Ω, 3.0 watts
0-500 Ω, 3.0 watts
0-1000 Ω, 1.0 watts
other ranges available



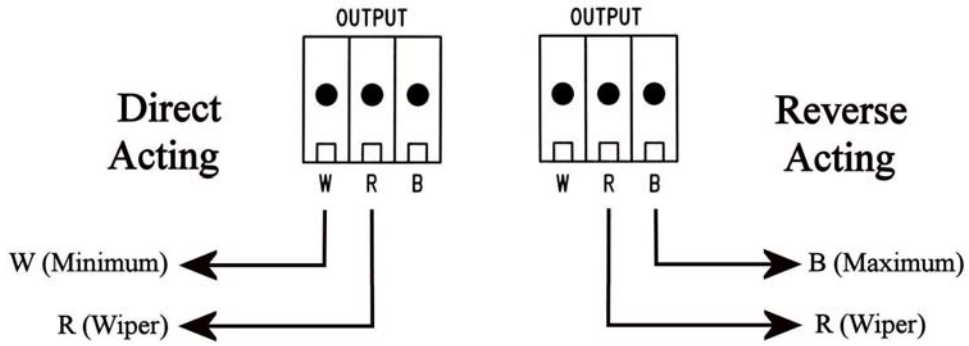
Using the 20V output to power a loop-powered sensor
Configure the input DIP switches for 4-20 mA

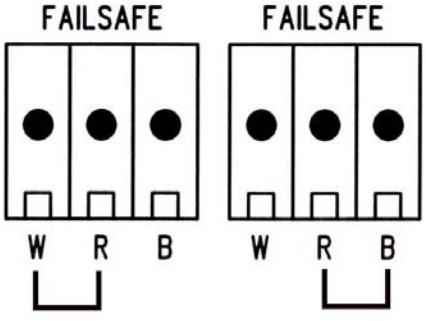


Connecting a 0-10 Vdc signal from a controller
Configure the input DIP switches for 0-10 Vdc



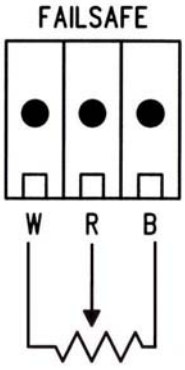
Configure a 2-wire resistance output for direct or reverse acting operation





Jumper W-R for Failsafe to minimum value

Jumper B-R for Failsafe to maximum value



Connect an external pot for manual control
Set the jumper to MAN for manual control