

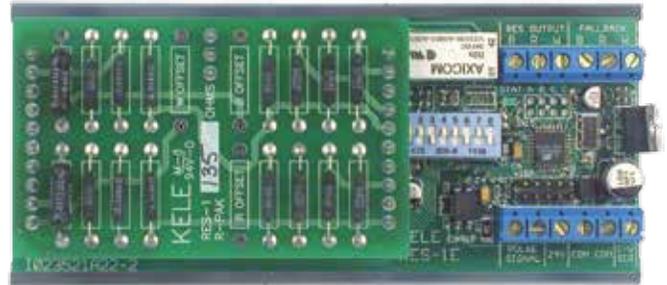


DESCRIPTION

The **Kele RES-1E Series universal resistance transducer** provides a precision resistance output for DDC control of electric actuators or other electronic devices that operate from a variable resistive circuit. Various selectable analog and pulse-width modulated (PWM) inputs are available, and the transducer may be powered from 24 VAC or 24 VDC. The **RES-1E** is furnished with snap-track for easy mounting.

FEATURES

- *Ideal for controlling electric actuators*
- *Replaces potentiometer or temperature sensor in boiler/chiller reset circuits*
- *0-20 mA, 4-20 mA, 0-5V, 1-5V, 0-10V, 2-10V, 0-15V, 3-15 VDC or PWM input signals, DIP switch selectable*
- *AC/DC powered*
- *Replaces motorized slide-wire potentiometer controller*
- *0-135Ω, 0-270 , 0-500 , and 0-1000 standard outputs, custom ranges available*
- *Snap-track mounting*
- *Failsafe mode and signal loss feature*
- *LED indication*



RES-1E



OPERATION

The **RES-1E** simulates a three-wire potentiometer output proportional to an analog or PWM input signal. The resistance between output terminals B and R increases (W and R decreases) as the input signal increases. The resistance between output terminals B and R decreases (W and R increases) as the input signal decreases. When 24V power is interrupted at the **RES-1E** power terminals, the failsafe mode internally connects the output terminals to the fallback pot terminals, allowing an alternate back-up controller or potentiometer to be used for control.

SPECIFICATIONS			
Supply Voltage	24 VAC $\pm 10\%$, half-wave; or 24 VDC $\pm 10\%$	Linearity	$\pm 1\%$ of span
Supply Current	220 mA @ 24 VAC, 100 mA @ 24 VDC	Output	0-135Ω, 0-1000Ω, 0-270Ω, 0-500Ω, Special range (specify upon ordering, min span = 30Ω, maximum span = 1 MΩ)
Accuracy	$\pm 1\%$ of span	Output Resolution	255 steps
Input	Various selectable analog and pulse width modulated (PWM)	Wiring Terminations	Screw terminals
Input Signal	0-20 mA, 4-20 mA, 0-5 VDC, 1-5 VDC, 0-10 VDC, 2-10 VDC, 0-15 VDC, 3-15 VDC, or PWM	Operating Temperature	32° to 158°F (0° to 70°C)
Pulse Rate	PWM time base selections 0.1-2.65, 5.2, 12.85, 25.6, or 0.59-2.93 seconds	Operating Humidity	5% to 95% RH (non-condensing)
Input Impedance	250Ω (current); 27.5 kΩ (voltage)	Dimensions	3.3"H x 6.5"W x 1.3"D (8.3 x 16.5 x 3.2 cm)
		Weight	0.7 lb (0.32 kg)
		Approvals	RoHS
		Warranty	1 year

CURRENT OR VOLTAGE ANALOG CONTROL

Option "PLMEM" = power loss memory, option "SLH" = signal loss hold

INPUT TYPE	SIGNAL RANGE	OPTIONS	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Analog	0-5V	*	1	1	0	0	0	1	1	0
Analog	0-10V	*	0	1	0	1	0	1	1	0
Analog	0-15V	*	0	0	0	0	1	1	1	0
Analog	0-20 mA	*	1	1	1	1	1	1	1	0
Analog	1-5V	No PLMEM, no SLH	1	1	0	0	0	0	0	1
Analog	2-10V	No PLMEM, no SLH	0	1	0	1	0	0	0	1
Analog	3-15V	No PLMEM, no SLH	0	0	0	0	1	0	0	1
Analog	4-20 mA	No PLMEM, no SLH	1	1	1	1	1	0	0	1
Analog	1-5V	No PLMEM, with SLH	1	1	0	0	0	0	1	1
Analog	2-10V	No PLMEM, with SLH	0	1	0	1	0	0	1	1
Analog	3-15V	No PLMEM, with SLH	0	0	0	0	1	0	1	1
Analog	4-20 mA	No PLMEM, with SLH	1	1	1	1	1	0	1	1
Analog	1-5V	With PLMEM, with SLH	1	1	0	0	0	1	1	1
Analog	2-10V	With PLMEM, with SLH	0	1	0	1	0	1	1	1
Analog	3-15V	With PLMEM, with SLH	0	0	0	0	1	1	1	1
Analog	4-20 mA	With PLMEM, with SLH	1	1	1	1	1	1	1	1

* For analog inputs that are valid all the way to zero, there is no condition where power loss memory and signal loss hold apply.

POWER LOSS MEMORY, ANALOG INPUT WITH NON-ZERO START VALUE:

At powerup, if analog input is below normal start value, the resistance output will go to the value set by the last valid analog input before power was lost.

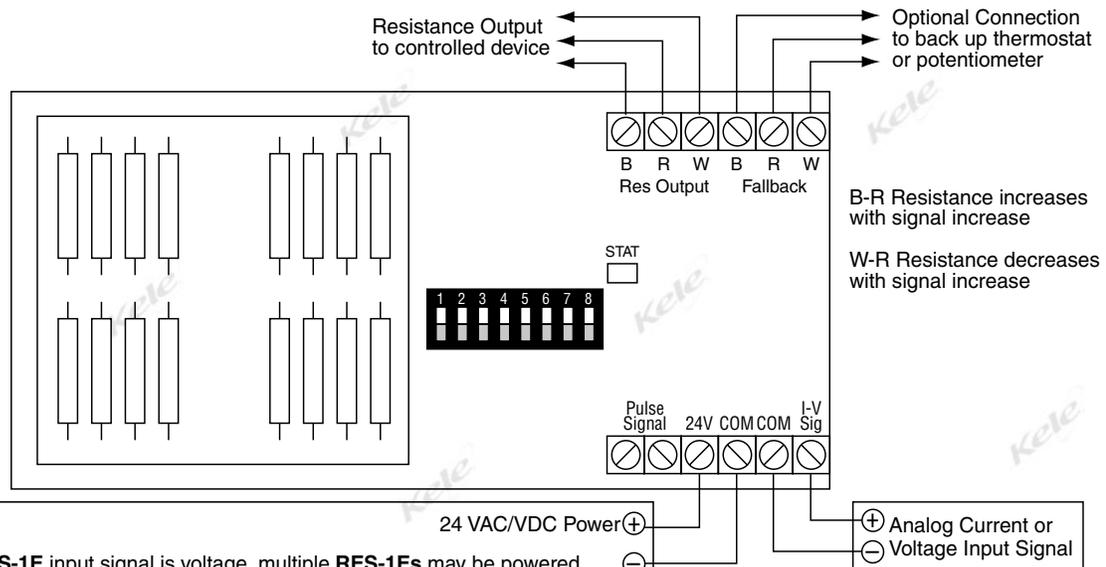
If power loss memory is disabled and, at powerup, analog input is below normal start value, the resistance output will go to minimum until a valid analog input is received.

SIGNAL LOSS HOLD, ANALOG INPUT WITH NON-ZERO START VALUE:

If the analog input drops below the normal start value, the resistance output will stay at the value set by the last valid analog input.

If signal loss hold is disabled and the analog input drops below the normal start value, the resistance output will go to minimum until a valid analog input is received.

ANALOG CONTROL WIRING



Notes:

1. If the RES-1E input signal is voltage, multiple RES-1Es may be powered from the same power supply or transformer.
2. If the RES-1E input signal is current from a current sourcing controller, multiple units may be powered from the same power supply or transformer.
3. If input signal is current from a current sinking controller, each RES-1E must have a separate power supply or transformer.



PWM CONTROL

Option "PLMEM" = power loss memory

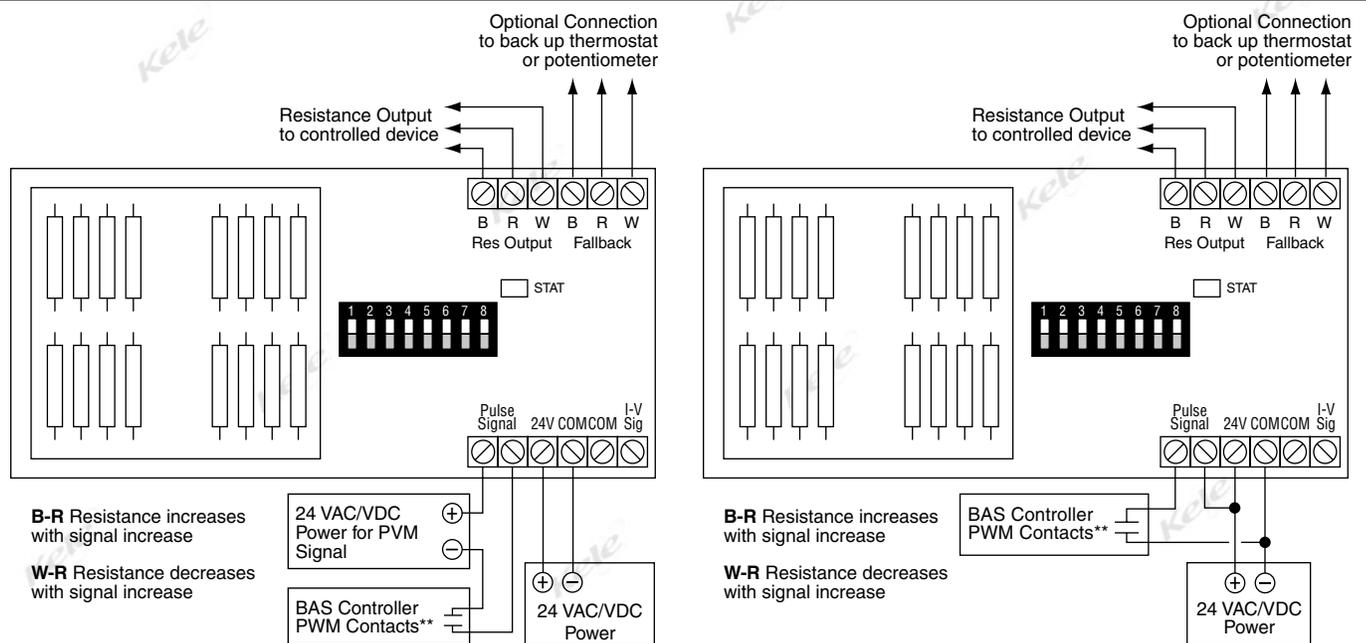
INPUT TYPE	SIGNAL RANGE	OPTIONS	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
PWM	0.1-2.65 sec	No PLMEM	0	0	0	0	0	0	0	0
PWM	0.1-2.65 sec	With PLMEM	0	0	0	1	0	0	0	0
PWM	0.1-5.2 sec	No PLMEM	0	0	0	0	1	0	0	0
PWM	0.1-5.2 sec	With PLMEM	0	0	0	1	1	0	0	0
PWM	0.1-12.85 sec	No PLMEM	0	0	0	0	0	1	0	0
PWM	0.1-12.85 sec	With PLMEM	0	0	0	1	0	1	0	0
PWM	0.1-25.6 sec	No PLMEM	0	0	0	0	1	1	0	0
PWM	0.1-25.6 sec	With PLMEM	0	0	0	1	1	1	0	0
PWM	0.59-2.93 sec	No PLMEM	0	0	0	0	0	0	1	0
PWM	0.59-2.93 sec	With PLMEM	0	0	0	1	0	0	1	0

POWER LOSS MEMORY, PWM INPUT:

At powerup, the resistance output will go to the value set by the last PWM pulse before power was lost. The output will remain at this value until a new PWM pulse is received.

If power loss memory is disabled, the resistance output will go to minimum at powerup and remain there until a new PWM pulse is received.

PWM CONTROL WIRING



** PWM signal input terminals are optoisolated and polarity insensitive.
PWM computer contacts can switch either PWM wire lead.



TRANSDUCERS

UNIVERSAL RESISTANCE TRANSDUCER

RES-1E SERIES

INSTALLATION AND CHECKOUT

INSTALLATION

Mount the device inside an enclosure near the controlled equipment, avoiding areas of temperature extremes, corrosive vapors, or electromagnetic interference. Use track slots for screw attachment. Note: Protect circuit board from metal filings created during panel construction. Make all connections according to wiring diagram or as shown in the job diagram and in compliance with national and local codes. Use shielded #18 gauge cable for connections from the transducer to the controller. The unit comes precalibrated for easy application.

CHECKOUT

Tools required: Volt ohmmeter, signal analyzer or other signal source.

1. Verify that the input selector switches are in the correct position for the input signal to be used.
2. Verify that either 24 VAC or VDC is present at the power terminals.
3. With the controlled device disconnected, connect an ohmmeter to the B and R terminals on the **RES-1E** output. With no signal input, the resistance between B and R should be at minimum, and the resistance between W and R should be at maximum resistance.
4. Apply the minimum input signal for the range selected to the input terminals. The **RES-1E** should output less than 2% of full range, the minimum resistance of the **RES-1E**.
5. Slowly increase the input signal. The resistance reading will increase linearly toward full range. If the resistance does not vary with the input signal, check the polarity of the input wiring.

LED INDICATION

Steady green: power on and idle

Slow green blink (three blinks/pause): Signal loss hold

Rapid green blink: PWM pulse being received

CAUTION: Make all connections with power removed. Failure to do so could result in circuit board damage.

ORDERING INFORMATION

MODEL	DESCRIPTION
RES-1E	Universal resistance transducer, 0-135Ω output
RES-1E-270	Universal resistance transducer, 0-270Ω output
RES-1E-500	Universal resistance transducer, 0-500Ω output
RES-1E-1000	Universal resistance transducer, 0-1000Ω output
RES-1E-S	Universal resistance transducer, special range output (specify Ω range; min span = 30Ω, maximum span = 1 MΩ, start can be above zero)

	RELATED PRODUCTS
R-PAK	Resistance board only for RES-1E (specify Ω range, minimum span 30Ω, maximum span 1 MΩ)