MODEL 70B

RESISTANCE SENSING POWER RELAYS

- For precision control of resistance-type transducers . . . such as RTD's, thermistors, pressure sensors, strain gages, etc.
- Ten models cover all resistance ranges between 1 ohm and 95k ohms.
- Adjustable trip point can be set to O.5% accuracy.
- Available with or without electromechanical power relay or with solid-state power relay.

OPERATION IS SIMPLE

The 70B series **Resistance Sensing Power Relay** are control device operated by any resistance-type transducer such as a resistance temperature detector, thermistor, strain gage, pressure transducer, accelerometer. photo cell, position indicator, or others. Any resistance-type transducer with an operating point or range between 1 ohm and 93K ohms can he used with one of the ten models which cover this range in overlapping increments. The device operates as a set-point relay; that is, it may be adjusted to trip at any pre-determined resistance.

TYPICAL APPLICATIONS

For example, a resistance temperature detector (RTD) may be connected to a **Resistance Sensing Power Relay** and adjusted to trip at a certain temperature; or a pressure sensor to trip at a desired pressure; etc. Its operation can be normal (switching circuit de-energized in non-operating condition), or "failsafe" (switching circuit energized in non-operating condition).

SPECIAL FEATURES

The ten models are each adjustable within their individual ranges by either a ten-turn pot with calibrated dial, or a ten-turn pot with screwdriver adjustment, options that are available at the time of ordering. You also have the option of ordering with or without an electro-mechanical power relay, or with a solid-state power relay for conventional switching of any load or "zero-voltage" switching of resistive loads.

HIGH ACCURACY

Like any other adjustable device, accuracy will depend upon the care used in its connection and adjustment. Using only the calibrated dial to visually adjust the set point, an accuracy of better than ±8% can be obtained. Using a known resistance to aid in the set-point adjustment, accuracies of 0.5% for the ten-turn dial may he obtained. Once set, all models will provide a repeatability of ±0.5%.

EASY TO USE

Resistance Sensing Power Relays are completely solid-state and have no moving parts except the electro-mechanical power relay if specified. The resistance sensing input circuit is isolated from other circuitry and operates with less than 16 volts on the electrodes. They are easy to use, accurate, dependable. and universal in application. See the following 2 pages for additional information.

POWER REQUIREMENTS:

All standard models are for 115 VAC, 50/60 cps, single phase, less than 10 VA. Other line voltages and/or frequencies are available on special order at additional cost.

AMBIENT TEMPERATURE RANGE: 0 to +140° F.

PACKAGING AND TERMINATION:

All circuitry except electro-mechanical power relay is solid-state. The electromechanical power relay and the solid-state power relay are a standard octal plug-in type. All terminations are at screw terminals on top of unit. NEMA enclosures can be supplied for all models.

TRIP POINT ADJUSTMENT (See Note I):

All models are available with either of two methods of adjusting the trip point:

"TC" — Ten-turn pot with turns-counting calibrated dial, 0-1000 divisions; can be visually set using an appropriate range multiplier with an accuracy of better than ±8%; or can be set with the aid of a known resistance with an accuracy of 0.5% To order, add "TC" to the basic model number.

"T" — Ten-turn pot with uncalibrated dial, screwdriver adjustment; can be set with aid of known resistance with accuracy of 0.5% To order, add "-T' to basic model number.

RESISTANCE SENSING CIRCUIT:

Can be wired for either standard two-wire input for most standard resistance-type transducers, or for three-wire inputs for special leads-resistance canceling circuits.

POWER RELAY OUTPUT CIRCUIT:

All models are available with your choice of either an electro-mechanical power relay, a solid-state power relay, or without an output switching device.

Electro-Mechanical Power Relay:

Two form C contacts (DPDT) UL rated at 10 amps resistive load, 1/4 HP, 115/230 VAC. Has standard octal plug-in base.

Solid-State Power Relay:

Your choice of conventional switching for any type load, or "zero-voltage" switching for resistive loads only; uses standard octal plug-in base; current ratings of 5, 10, or 15 amperes AC. Additional information may be found in separate Bulletin "SR"

Circuit Specifications:

For those interested in ordering models without an output switching device, the circuit will deliver 12 VDC nominal to a 120 ohm resistive load.

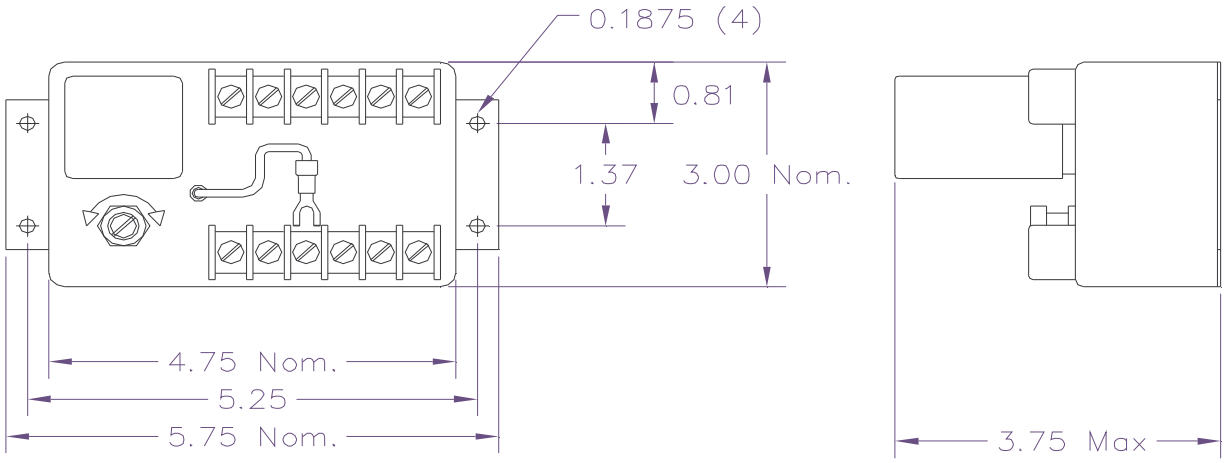
FAIL SAFE OPERATION:

All models may he operated in either the normal manner (switching Circuit de-energized in non-operative condition) or for "fail-safe" operation (switching circuit energized in non-operative condition) by simple terminal connection change.

Transducer Operation Range	Maximum ▲R Required to Operate Control	Range Multiplier For 10-Turn Dial	Model Number See Note 1
1 - 23 ohms	.05 ohms	0.20	70B-31*
5 - 90 ohms	.05 ohms	0.20	70B-30~
10 - 185 ohms	.05 ohms	0.25	70B-27
20 - 460 ohms	.05 ohms	0.50	70B-29
50 - 930 ohms	.05 ohms	1.00	70B-20
100 - 1850 ohms	.05 ohms	2.00	70B-21
200 - 4650 ohms	.05 ohms	5.00	70B-22
500 - 9300 ohms	2.0 ohms	10.00	70B-23
1000 - 18.5k ohms	4.0 ohms	20.00	70B-24
2000 - 46k ohms	30 ohms	50.00	70B-25
5000 - 93k ohms	100 ohms	100.00	70B-26

NOTE 1 - add suffix shown in "Trip Point Adjustment" above to model number to specify correct adjustment pot.

* 31T under mode only ~ 30 Over - Under



APPLICATIONS

RESISTANCE TEMPERATURE DETECTORS

Model 70B Resistance Sensing Power Relays are used more frequently with Resistance Temperature Detectors (RTD) than with any other type of resistance transducer. For this reason, four basic types of RTD are available for use with Model 70B controls. These temperature detectors have Industry-standard elements and are available in four styles: Industrial RTD Probes, Industrial RTD Molded Sticks, General Purpose Resistance Thermometers, and General Purpose Flexible Surface Sensors. They may be used as shown in this table:

Typical RTD Element	Input Resistance	Operating Temperature Range		Resistance Sensing Relay
	Min-Max	ºC	ºF	Model No.
67Ω at 25ºC NiFe	50 - 930Ω	-200ºC to +103ºC	-328ºF to +219ºF	70B-20
	100 - 1850Ω	-200ºC to +260ºC	-328ºF to +500ºF	70B-21
120Ω at 25ºC Nickel	100 - 1850Ω	-29ºC to +310ºC	-21ºF to +590ºF	70B-21
	10 - 185Ω	-80ºC to +82ºC	-112ºF to +181ºF	70B-27
	20 - 460Ω	-80ºC to +310ºC	-112ºF to +590ºF	70B-29
100Ω at 0ºC Plat.	50 - 930Ω	-122ºC to +700ºC	-189ºF to +1292ºF	70B-20
	100 - 1850Ω	0ºC to +700ºC	32ºF to +1292ºF	70B-21
	10 - 185Ω	-200ºC to +220ºC	-328ºF to +429ºF	70B-27
	20 - 460Ω	-200ºC to +700ºC	-328ºF to +1292ºF	70B-29
10Ω at 25ºC Copper	1 - 23Ω	-200C to +260ºC	-328ºF to +500ºF	70B-31*

*31T under mode only

NOTE: Although several models may cover the user's desired temperature range it is advantageous to select the model having the smallest temperature span because of better setability obtained from greater pot resolution.

OTHER TRANSDUCERS

Thermistors, Airspeed Sensors, Depth Transducers, Accelerometers, Strain Gages, Pressure Transducers, Altitude Transducers. Linear Position Sensors and Inclinometers may be used with Resistance Sensing Power Relays. These types usually have resistance ranges from 500 ohms to 100,000 ohms, and will work well with the appropriate model shown in the Table on Page 2 of this Bulletin.

HOW TO ORDER

1.MODEL NUMBER

Determine the correct basic MODEL NUMBER by referring to the Table above for resistance temperature sensor input, or on Page 2 of this bulletin for other transducers.

2.ADJUSTMENT CONTROL DASH NUMBER

Add a dash number to the basic model number for the type of adjustment control desired (see specs on Page 2 of this Bulletin):

TC — Ten-turn pot with turns-counting dial.
T — Ten-turn pot with un-calibrated dial.

3. EXAMPLE

Model number 70B-21-TC describes a Resistance Sensing Power Relay for use with a 676 ohm at 25° C NiFe resistance temperature sensor, equipped with a ten-turn pot with turns-counting calibrated dial.

4.OTHER OPTIONS

If a solid state output relay, special enclosure, or other option is desired, a note must be added to the Model Number indicating the appropriate model numbers of the options.

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