MDP SERIES SMALL POLARIZED RELAYS

For Bi-Stable or Center-Stable Operation
Small size, ultra-sensitivity and high speed switching together with efficient, fence-free action characterize MDP polarized relays. Their operation depends on both the magnitude and direction of the coil current. Two types of contact arrangements provide the following action when the coils are de-energized: Bi-stable — armature remains in its last energized position; Centerable — armature remains in center-off position with contacts open. Contact materials and listed. Temperatures: -60°C to +85°C. MDP relays are equipped with a plastic dust cover and 8 or 12-pin plugs. Weight: 41 oz.

Types MDP-900-1 and MDP-920-1 (with extra long life contacts) will directly replace Western Electric Type 265 relays. 2 1/2" square x 3 1/2" overall height. Weight: 10 oz. 9MDP45 Holobrückt Bracket to adapt MDP relays to Barber-Coleman socket.

See ordering information on page 1.

ORDERING INSTRUCTIONS — File-O-Matic Sec. 23
All coil voltages are 120 VAC, 60 Hz, non-ferro-magnetic leads. When ordering specify relay type and coil voltage or resistance. Formations: 100 Solid AC, 60 Hz or 208, 1500 ohm resistance. To operate 110V DC relays on 208V DC use a 2 watt-wound resistor at a value approximately the relay coil resistance in series with the relay coil. CONTACT SERIES: 3 knobs, 3-speeds, 4-Pole, 1-Throw, 1-Magnet, O-Open, C-Closed, B-Break, M-Multi. Prices and Specifications subject to change without notice. For latest prices refer to United Pricing Service.

IN STOCK AT LEADING ELECTRONIC PARTS DISTRIBUTORS

GA SERIES Low cost, all-screw, multiple contact, voltage switching relay. Used for many industrial control applications. Tension, general single type terminal. Contacts: 5, 6, 8, 10, designed for fasteners, motors, industrial applications. 3 3/4" x 1 1/2" x 1 1/2" with holding lugs. Weight: 51 oz. See GP series for similar relays having 10 amp ratings. (Page 6).

GP SERIES Replaces AC and DC relays to make high DPDT or DPST switches: AC coils (GPA) available in 6, 12, 24, 120 and 240 volt, DC coils (GPD) available in 6, 12, 24 and 110 volt; current rating 2.500, 5.900 and 10.300 ohms. Contacts: 5, 6, 8, 10. GP21 Switch Assembly: DPST 1 snap $1.60 GP21 Switch Assembly: DPDT 1 snap $2.50 GP-100 A complete kit of GP Series coils and washers providing the following: AC coils: Two 6V, two 6V, voltage, four 4V, six 120V, two 240V, DC coils: Two 6V, two 12V, four 12V, four 110V. Also two 2.500 and four 6.900 ohm coils, eight universal DPDT switch assemblies. Fourteen GPST switch assemblies. The complete kit is ideal for 3 or 4 amp instruments, school and industrial laboratories.

HP SERIES This commercial microcircuits relay is recommended for applications requiring high performance in minimum space, such as TV camera, detecting machine, desk top computer, copying machines and chassis. For card board or rack mounting. Two types: HP-10, HP-12. HP-12 has 12 volt coil, 24 volt, 120 volt, 200 volt, 300 volt, 10 volt, 200 volt, 300 volt, 1 volt. Also a 2.500 and four 6.900 ohm coils, eight universal DPDT switch assemblies. Fourteen GPST switch assemblies. The complete kit is ideal for industrial laboratories, school and industrial laboratories.

EEM File System Sec. 4590 ELECTRONIC ENGINEERS MASTER

<table>
<thead>
<tr>
<th>CONTACT SERIES</th>
<th>DESCRIPTION</th>
<th>NUMBER OF CONTACTS</th>
<th>SOLENOID TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP21</td>
<td>DPST</td>
<td>1 snap</td>
<td>$1.60</td>
</tr>
<tr>
<td>GP21</td>
<td>DPDT</td>
<td>1 snap</td>
<td>$2.50</td>
</tr>
<tr>
<td>GP-100</td>
<td>Kit</td>
<td>2.500, 5.900, 10.300 ohms</td>
<td>$1.60, $2.50</td>
</tr>
<tr>
<td>HP-10</td>
<td>12 volt</td>
<td>24 volt, 120 volt, 240 volt, 6V, 12V, 110V, 200 volt, 300 volt, 1 volt</td>
<td>$2.00</td>
</tr>
<tr>
<td>HP-12</td>
<td>12 volt</td>
<td>120 volt, 200 volt, 240 volt, 120 volt, 220 volt, 300 volt, 1 volt</td>
<td>$2.00</td>
</tr>
</tbody>
</table>

Shipping and Handling:

16 oz or less $1.50
17 oz or more $3.00

(All prices subject to change without notice.)

Economical Relay

For more information, please contact Potter & Brumfield.

STOCK CATALOG 100
ISSUED MARCH 2007
KA AND KAP SERIES Small, low-cost, highly-efficient general-purpose relays for handling light power loads such as control circuits, control and annunciator circuits, and general interchangeable parts. K2A is standard duty relay. KAP is self-contained relay. KAP Series has stainless steel armature magnets, solid-state contacts, and a slim, compact design. 

KAP holds tested spring, SKAP 50 per box, weight 2 ozs. Not $25.

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Potter & Brumfield Relays

**SPECIAL PURPOSE RELAYS**

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
<th>Contacts</th>
<th>Power</th>
<th>Price</th>
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<tbody>
<tr>
<td>KM-15</td>
<td>01H</td>
<td>4A</td>
<td>125V</td>
<td>$1.80</td>
</tr>
<tr>
<td>KM-17</td>
<td>02H</td>
<td>4A</td>
<td>125V</td>
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<tr>
<td>KM-18</td>
<td>03H</td>
<td>4A</td>
<td>125V</td>
<td>$2.60</td>
</tr>
<tr>
<td>KM-19</td>
<td>04H</td>
<td>4A</td>
<td>125V</td>
<td>$2.80</td>
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<tr>
<td>KM-20</td>
<td>05H</td>
<td>4A</td>
<td>125V</td>
<td>$3.00</td>
</tr>
<tr>
<td>KM-21</td>
<td>06H</td>
<td>4A</td>
<td>125V</td>
<td>$3.20</td>
</tr>
</tbody>
</table>

**SM SERIES**

**SM SERIES MOTOR STARTING RELAYS**

For starting electric motors. Operates on both sides of start winding. Armature gap can be adjusted by winder, Carbon U. S, contacts. Contacts: 0.5 mm, 0.5 amp. Weight: 2 oz. faces. Non-reversing. Mounting: 2.5 x 0.5 with 1/4" nut. Cylindrical, 1/4" dia., bakelite. Price: 30c each. NET $2.85/doz.

**PC SERIES**

Single pole double throw relay for on/off and current reversal switching in electromagnetic relays. Operates on 30-volt, 5 ampere circuit. Contacts: 0.5 mm, 0.5 amp. Weight: 2 oz. faces. Bakelite. Price: 30c each. NET $2.85/doz.

**SA SERIES STEPPING SWITCH**

A two-position stepping relay with presettable circuit delay to switch currents up to 200 milliamps. Armature-driven, geared switch operates on 30-volt, 5 ampere circuit. Operating: 2.5 x 0.5 with 1/4" nut. Contacts: 0.5 mm, 0.5 amp. Bakelite. Price: 30c each. NET $2.85/doz.

**GB SERIES**

Uses (1/4" slot page 1 for similar voltage actuated relays). Sensitivity 150 milliamps for single pole and 250 milliamps for 4 poles. Medium out, high quality relay. Single pole or 2 pole operation. Contacts: 0.5 mm, 0.5 amp. Weight: Approximately 5 oz.

**KCP SERIES**

Low cost plate circuit relay designed for use with high speed, high quality relays. Sensitivity 150 milliamps for single pole, 250 milliamps for double pole, 250 milliamperes for three poles. Mounting: 2.5 x 0.5 with 1/4" nut. Contacts: 0.5 mm, 0.5 amp. Bakelite. Weight: Approximately 5 oz. Use KCP-KBP to obtain definite position mounting (see page 2).

**PLATE CIRCUIT AND SENSITIVE RELAYS**

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
<th>Contacts</th>
<th>Power</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>KB-10A</td>
<td>01H</td>
<td>4A</td>
<td>125V</td>
<td>$1.80</td>
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<tr>
<td>KB-11A</td>
<td>02H</td>
<td>4A</td>
<td>125V</td>
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<tr>
<td>KB-12A</td>
<td>03H</td>
<td>4A</td>
<td>125V</td>
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<tr>
<td>KB-13A</td>
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<tr>
<td>KB-14A</td>
<td>05H</td>
<td>4A</td>
<td>125V</td>
<td>$3.00</td>
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<tr>
<td>KB-15A</td>
<td>06H</td>
<td>4A</td>
<td>125V</td>
<td>$3.20</td>
</tr>
</tbody>
</table>

**LB SERIES**

Designed for top performance, low life at semianum. Directly 250 milliamps for single pole and 500 milliamps for double pole. Mounting: 2.5 x 0.5 with 1/4" nut. Weight: Approximately 3 oz.

**LM SERIES**

(See KL page 2 for similar voltage actuated relays). Sensitivity: 50 milliamps for single pole and 250 milliamps for double pole. Mounting: 2.5 x 0.5 with 1/4" nut. Weight: Approximately 3 oz.

**PW SERIES**

In both voltage and current actuated models. Sensitivity: 50 ma. for current actuated models. 250 ma. for voltage actuated models. Mounting: 2.5 x 0.5 with 1/4" nut. Weight: Approximately 3 oz.

**RS SERIES**

In both voltage and current actuated models. Sensitivity: 50 ma. for current actuated models. 250 ma. for voltage actuated models. Mounting: 2.5 x 0.5 with 1/4" nut. Weight: Approximately 3 oz.

**SM SERIES**

In both voltage and current actuated models. Sensitivity: 50 ma. for current actuated models. 250 ma. for voltage actuated models. Mounting: 2.5 x 0.5 with 1/4" nut. Weight: Approximately 3 oz.

**SS SERIES**

Ultra sensitive provides relay. 50 ma. sensitivity. Dual extra-connected coils with balanced arms in needle-point bearing for all moving elements to ensure long life. Weight: Approximately 3 oz.

**TELEPHONE TYPE RELAYS**

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
<th>Contacts</th>
<th>Power</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR-10A</td>
<td>01H</td>
<td>4A</td>
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<tr>
<td>TR-15A</td>
<td>06H</td>
<td>4A</td>
<td>125V</td>
<td>$3.20</td>
</tr>
</tbody>
</table>

**BS SERIES**

Long life telephone type relays. Rated to operate computer and circuitry equipment applications requiring large numbers of poles. Touched, normal relay. Mounting: 2.5 x 0.5 with 1/4" nut. Weight: Approximately 3 oz.

**BS DUST COVER**

### LS SERIES

**Telephone Type Relays**

<table>
<thead>
<tr>
<th>Type</th>
<th>Codes</th>
<th>Contacts</th>
<th>Series</th>
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<td>L3-10</td>
<td>24-C</td>
<td>10</td>
<td>100</td>
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<td>L3-11</td>
<td>24-C</td>
<td>10</td>
<td>100</td>
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<td>L3-12</td>
<td>24-C</td>
<td>10</td>
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</tr>
<tr>
<td>L3-13</td>
<td>24-C</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>L3-14</td>
<td>24-C</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

**Special Features:**
- Short springs and light weight
- Provides fast action without sacrificing reliability and long life
- Stainless steel hinge bearing designed to give 500 million cycles of operation
- No torque action
- Footprint: Two No. 6-32 tapped holes on 1" centers. Weight: Approx. 4 oz.
- Solder contact area. Mated 1/100 mil gold plating contacts. Weight: Approx. 4 oz.

### MB SERIES

**Miniature DC contactor.**

- Designed for very high current applications.
- Enameled copper construction ensures long life.
- Dustproof: 100 ampere ratings for 5.5 amp.
- Contact area: 1.21" x 0.25". Weight: 2 oz.
- Continuous: 1/16" after her contact. Handle: Two No. 5-40 tapped holes on 1/2" centers. Weight 3 oz.

### MC SERIES

**Built-in contactor contact for EP switching to minimize contact bounce.**

- Quick detachable. 5.5 ampere contact area. 1.21" x 0.25" max.
- Thru-bolted, parallel type terminals.
- Contact area: 1.21" x 0.25" max. Weight: 5 oz.

### MG SERIES

**Sub-miniature telephone type relay can be furnished open, sealed or in sub-miniature boxes.**

- Metal [Open model, BR116, see No. 6-32 threaded hole, 1/2" long plus locating hole]. All other open models have three No. 6-32 holes on 1/2" centers.
- Mated 1/100 mil gold plating contacts. Weight: Approx. 2 oz.
- Mated 1/100 mil gold plating contacts. Weight: Approx. 2 oz.

### MM SERIES MINIATURE TYPE

**Ideal for applications where space and weight are limited.**

- Open model, 220-380, see No. 6-32 threaded hole, 1/2" long plus locating hole. All other models have three No. 6-32 holes on 1/2" centers.
- Mated 1/100 mil gold plating contacts. Weight: Approx. 2 oz.
- Mated 1/100 mil gold plating contacts. Weight: Approx. 2 oz.

---

**Potter & Brumfield Relays**

**PC SERIES**

- Conventional miniature relay has fast operating speed and outstanding reliability. Ideal for use in instrumented or relayed systems. Weight: 3 oz.
- Weight: 3 oz.
- Weight: 3 oz.

**FL SERIES**

- Dual-coil latch type relay can be used in many applications where momentary or latching action is required. Weight: 3 oz.
- Weight: 3 oz.
- Weight: 3 oz.

**HC SERIES**

- 24" leads are available on request. Weight: 3 oz.
- Weight: 3 oz.
- Weight: 3 oz.

**SC SERIES**

- 24" leads are available on request. Weight: 3 oz.
- Weight: 3 oz.
- Weight: 3 oz.

**SL SERIES**

- Dual-colour minimum relay is a miniature relay with quick check-feedback and quick check-feedback. Weight: 3 oz.
- Weight: 3 oz.
- Weight: 3 oz.

**TL SERIES**

- High performance 449P relay maintains the same contact rating as the LE899P but with improved reliability. Weight: 3 oz.
- Weight: 3 oz.
- Weight: 3 oz.

---

For more detailed information, see ordering information on page 1.
MERCURY-WETTED CONTACT
JM SERIES RELAYS

Rare long life, high speed, and unrivaled dependability— all are

the result of the basic component of these relays: a hermetically
sealed glass capsule. It contains the contact arrangement and a
small reservoir of mercury sealed in a high-pressure hydrogen
atmosphere. A film of mercury is renewed for every operation
that’s why you can think in terms of billions of operations
without contact bounce, pits or paws.

TWO TYPES OF CAPSULES

The capsule used in JMF modules and JML relays has a SPDT,
break-before-make (Form C), non-heating contact arrange-
m ent. Each capsule used in JMF, and JML to JM4 relays has a
SPDT, make-before-break (Form D1), bridging contact ar-
range ment. JMF, JML and JMF series achieve a high rate of
safety by being protected magnetically.

CONTACT RATINGS

JMF and JML; 500V max., and 2 amps max., 100V A max.*
JMF and JML to JM4; 500V max., and 5 amps max., 250 VA max.*

*With contact protection unless in a low-level circuit. Design
of a single protection circuit consisting of resistor and capacitor
in series are packed with each relay.

OUTLINE DIMENSIONS

See ordering information on page 1.
SOLID STATE
TIME DELAY RELAYS
AS LOW AS 17.50

CH SERIES
CH series solid state time delay relays are engineered for a wide range of industrial applications where precise, accurate timing is essential. Encased in a molded white nylon fuse cover, CH time delays are knob-adjustable and stamped with plating or metal type terminals. A stable 50mA DPDT relay 2 second internally.

CD SERIES GENERAL PURPOSE
A wide selection of operational configurations, all with accurate time delay values, for exact time and sudden separations, are available in the CD series solid state time delay relays. These models of timing are available: knob-adjustable, momentary-adjustable, and fixed. CD series with either “on spec.” or “off spec.” are listed. Described for the most sophisticated accuracy requirements.

DESCRIPTION


APPROX. WEIGHTS:

SPECIFICATIONS

<table>
<thead>
<tr>
<th>CH SERIES</th>
<th>CD SERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dial Setting</td>
<td>Time-calibrated</td>
</tr>
<tr>
<td>Reference Value</td>
<td>&lt; 5% of full scale</td>
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<tr>
<td>Temperature Range</td>
<td>45°C to 15°C</td>
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<tr>
<td>Temperature Control</td>
<td>&lt; 10% of maximum</td>
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<tr>
<td>Voltage Range</td>
<td>2.5% of nominal</td>
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<tr>
<td>Transient Protection</td>
<td>Twice rated input voltage for 8 milliseconds</td>
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<tr>
<td>Inherent Fault Operation</td>
<td>Contacts transfer momentarily at 1000 cycles</td>
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<tr>
<td>Release Time</td>
<td>Yes</td>
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<tr>
<td>Repeatability</td>
<td>Yes</td>
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<tr>
<td>Polarity Reversal</td>
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<td>Protection on DC</td>
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WIDE SELECTION OF TIME DELAY RANGES

<table>
<thead>
<tr>
<th>TYPE</th>
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<th>VOLTAGE</th>
<th>NOTES</th>
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<td>1.0–10</td>
<td>24V AC</td>
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<td>120V AC</td>
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<td>&lt; 100a.50</td>
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<tr>
<td>CH38</td>
<td>1.0–10</td>
<td>115V DC</td>
<td>&lt; 100a.50</td>
</tr>
</tbody>
</table>

NOTES
1. Use internal relay with (SPST contacts rated at 10 amperes, 120V AC. 2. Use with Potter & Brumfield relay (PBL-100, 115V AC. 3. Use with Potter & Brumfield relay (PBL-100, 115V AC.

TM SERIES
TIME DELAY RELAYS AND AUTOMATIC RESET TIMERS

THREE TYPES:
- ON DELAY
- INTERVAL
- OFF DELAY

Potter & Brumfield TM series timers are available in a wide variety of timing and adjustable ranges. Three types of timing sequences, on delay, interval, and off delay are offered by Type TM-01, Type TM-11, and TM-21, respectively. They assure accurate timing control for motors, pumps, heaters, air conditioning, vending machines, machine tools and many other types of equipment. They are easy to install as all internal timer components are connected to external terminals. The self-lubricated 3 watt synchronous motor runs continuously and requires no shut-off switch. The durable molded phenolic enclosure and base provides protection against dust and moisture.

OUTLINE DIMENSIONS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>TM-01</th>
<th>TM-11</th>
<th>TM-21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>12V DC</td>
<td>12V DC</td>
<td>12V DC</td>
</tr>
<tr>
<td>Switch Load Capacity</td>
<td>600VA pilot duty</td>
<td>600VA pilot duty</td>
<td>600VA pilot duty</td>
</tr>
<tr>
<td>Motor</td>
<td>3 watt</td>
<td>3 watt</td>
<td>3 watt</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Plus or minus 1%</td>
<td>Plus or minus 1%</td>
<td>Plus or minus 1%</td>
</tr>
</tbody>
</table>

NOTES:
- Switches are independent of motor.

See ordering information on page 1.
A NEW CONCEPT IN A COMMERCIAL MICROMINIATURE RELAY

Intended for printed circuit board or socket mounting, the HP series micro-miniature relay introduces a new concept of a half crystal case size relay for commercial applications. It is designed specifically for high density packaging and reliable performance. Encased in a poly-carbonate dust cover, HP relays are suitable for plug-in or printed circuit board soldering. The terminals are arranged on a 0.30" grid.

Design advantages include a high-torque motor structure, DPDT gold plated silver alloy contacts, and an engineered balance between electrical and mechanical parameters assuring an inherent reliability infrequently associated with commercial relay types.

QUALITY SPECIFICATIONS:
Insulation Resistance: 1,000 megohms min. at 500V DC.
Breakdown Voltage: 500V rms 40 Hz between all mutually isolated contacts.
Temperature Range: -45°C to +75°C.
Expected Life: Electrical: 100,000 operations at rated load, Mechanical: 1,000,000 operations. Approximate Weight: 0.26 oz.

CONTACTS:
Arrangement: DPDT, 2 Form C.
Rating: Low level to 5 amps @ 30V DC; resistive; 0.5 amps max. @ 120V AC.
Contact Resistance: 50 milliohms before life measured at maximum rated load.

COILS:
Power: Approximately 662 watts nominal @ 25°C.
Data: Continuous.
Pick-up: 25% of nominal @ 25°C.
Reset Time: 5 milliseconds max. at nominal coil voltage and 25°C.
Release Time: 3 milliseconds max. at nominal coil voltage and 25°C.

Four inter-related factors, the contact system, the magnetic system, the environment, and the physical requirements for installation are prime considerations in the selection of the proper relay for a specific job.

CONTACTS
The contacts in an electromagnetic relay make or break connections in electric circuits. The contacts carry the in-rush as well as the nominal load current. How well they perform physically is dependent on their arrangement, mechanical construction and on the suitability of the contact materials.Electrically, two important factors influence contact performance: first, the magnitude of load current and open circuit voltage; second, the specific characteristics of the circuitry.

Potter & Brumfield offers a wide selection of relays to fit practically any type of physical and electrical contact requirement.

P&B standard relays carry a number to designate contact arrangements. Abbreviations are used for indicating the switching arrangement of each number.

For other than standard relays shown in the above table P&B series are designated in accordance with alphabetical indicators (Forms A, B, C, etc.), which denote the switching arrangement:

CONTACT FORMS
See ordering information on page 1.

ENCLOSURES
Certain environments require dust-proof or hermetically sealed enclosures. Prior to sealing, all P&B relays are cleaned ultrasonically to remove all possible contaminants. When indicated, hermetically sealed relays are tested with Radiolu Leak Test equipment. P&B's high-voltage breakdown test automatically checks in sequence all of the relay's possible voltage breakdown points.

TERMINALS
The choice of terminals is almost infinite; screw type, threaded stud, snap-on tab, pierced or wire solder lug, taper tab, cotrol base and other plug-in types meet every connection requirement. Terminals are also supplied for printed or dip solder circuits.

UNDERWRITERS' LABORATORIES LISTINGS
Certain appliance, motor control, industrial, and other relay applications require UL Listed relays. In Canada, the Canadian Standards Association listing may be necessary. Many P&B relays carry both U/L and CSA listings or U/L component recognition, thus saving relay users the extra cost and time required to have new designs examined.

See ordering information on page 1.