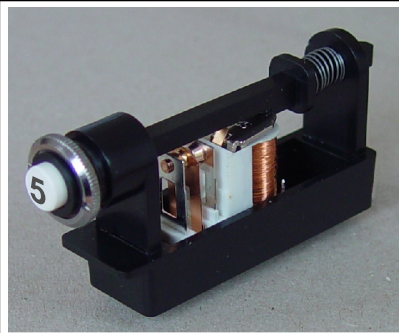


Circuit Breaker for Flight Simulators

Parts Number 871 722 802 27 53

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The Circuit Breaker for Flight Simulation is constructed around a 6v. relay combined with high quality ABS plastic components.

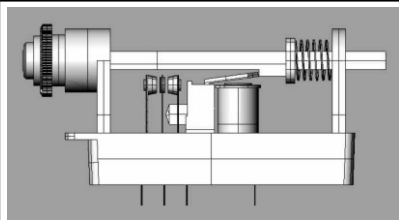
The position of the push button can be read out from the contacts, while the "pop-out" action is accomplished when the relay is activated for approx. 100 milliseconds at 12 v. / 500mA.

Both positions IN and OUT can be read from the built-in contacts.

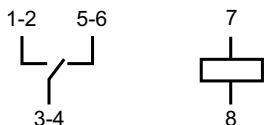
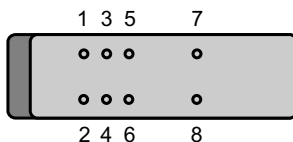
The Circuit Breaker can be mounted behind panels of a thickness varying from 1.5 to 3 mm.

The Circuit Breaker can be controlled from the Central Control Unit as offered by SimKits via an amplifier circuit or from any existing electronics.

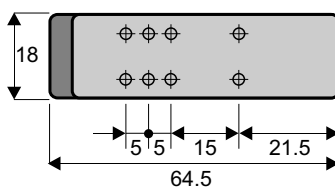
The SimKits Circuit Breaker offers a better reliability and immediate response compared to aviation circuit breakers, while very low power is needed.



Bottom View - connections



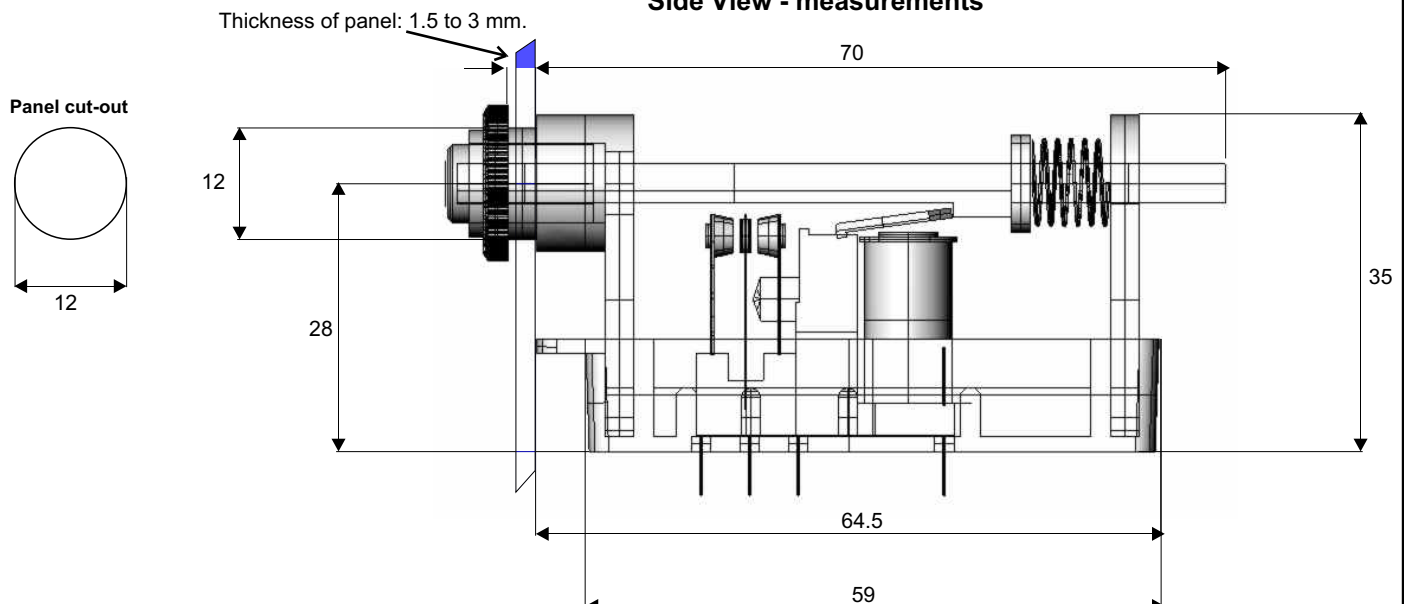
Bottom View - measurements



| Contact specifications | |
|--|------------------------------|
| Contact configuration | 1 CO (SPDT) |
| Rated current/Maximum peak current A | 16/30 |
| Rated voltage/Maximum switching voltage V AC | 250/400* |
| Rated load in AC1 VA | 4,000 |
| Rated load in AC15 (230 VAC) VA | 750 |
| Single phase motor rating (230 VAC) kW/HP | 0.55/0.8 |
| Breaking capacity in DC1: 30/110/220V A | 16/0.3/0.12 |
| Minimum switching load mW (V/mA) | 500 (10/5) |
| Standard contact material | AgCdO |
| Coil specifications | |
| Nominal voltage (UN) V AC (50/60 Hz) | 6 |
| Voltage applied during activation (max. 1 second) | 12 |
| Rated power AC/DC/sens. DC VA (50 Hz)/W | 1.2/0.65/0.5 |
| Operating range AC (50 Hz) | (0.8...1.1)UN |
| DC/sens. DC | (0.73...1.5)UN/(0.8...1.5)UN |
| Holding voltage AC/DC | 0.8 UN /0.4 UN |
| Must drop-out voltage AC/DC | 0.2 UN /0.1 UN |
| Technical data | |
| Mechanical life AC/DC cycles | 10 · 106/20 · 106 |
| Electrical life at rated load AC1 cycles | 100 · 103 |
| Operate/release time (bounce included) ms | 10/10 - (15/12 sens.) |
| Insulation according to EN 61810-5 | 3.6 kV/3 |
| Insulation between coil and contacts (1.2/50µs) kV | 6 (8mm) |
| Dielectric strenght between open contacts V AC | 1,000 |
| Ambient temperature range °C | -40...+85 |
| Protection category | IP 50 |

All measurements are in millimeters. (1 Inch = 25.4 mm.)

Side View - measurements



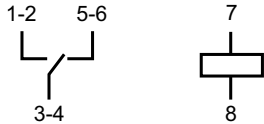
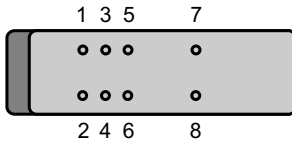
Circuit Breaker for Flight Simulators

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Bottom View - connections



Functionality of the Circuit Breaker

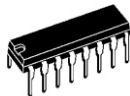
The connections 7 and 8 are the coil of the Relay, which is used in the Circuit Breaker. Applying a voltage of 12 volts during a maximum time of 1 second (preferable 200 milliseconds), releases the push-button of the Circuit Breaker. The push-button pops out for approx. 8 mm. (pushed-in, the push-button is only 2 mm. out). When pushed in completely, the contacts 3-4 and 5-6 are shortly closed during the manual push-in action. When the circuit breaker is in an "rest" position, non of the contacts are closed. When the circuit breaker is in an OUT position, the contacts 1-2 and 3-4 are closed.

Driving the relay

The Relay of the Circuit Breaker must be driven from 12 volts, using any type of electronics. When the circuit breaker has to be activated from a 5 volts pulse, it is recommended to use a driver circuit. A possible driver circuit using an ULN2003 (which contains 7 driving transistors) is shown below.

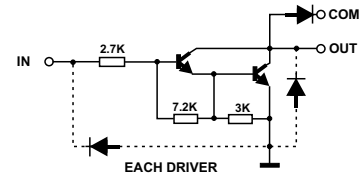
WARNING: The original voltage for the relay coil is 6 v. However, to release the circuit breaker pushbutton, during a maximum of 1 second, a voltage of 12 v. has to be applied.

Application notes

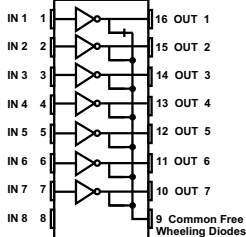


ULN2003A features:

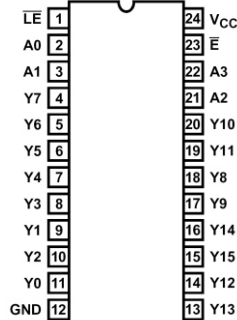
- Seven Darlingtons per package
- Output current 500mA per driver (600mA peak)
- Output voltage max. 50v.
- Integrated suppression diodes for inductive loads (relay)
- Outputs can be paralleled for higher current
- TTL/CMOS compatible inputs
- Inputs pinned opposite outputs to simplify layout.



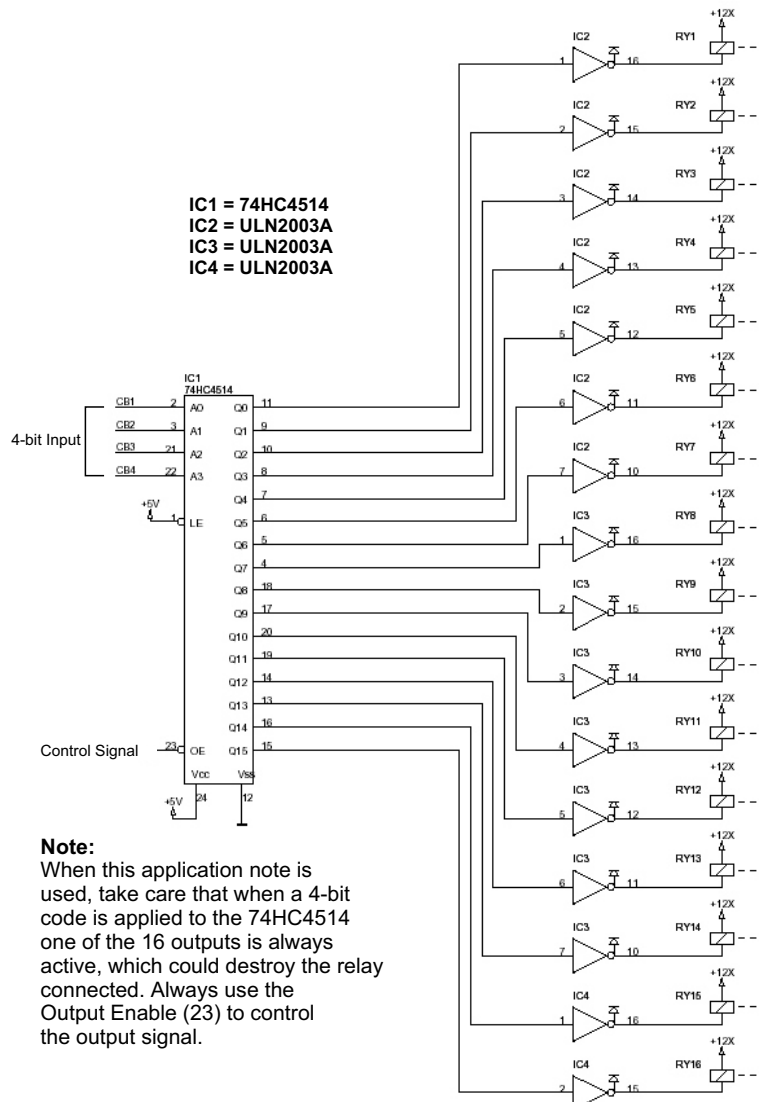
ULN 2003A



CD74HC4514



IC1 = 74HC4514
IC2 = ULN2003A
IC3 = ULN2003A
IC4 = ULN2003A



Note:
When this application note is used, take care that when a 4-bit code is applied to the 74HC4514 one of the 16 outputs is always active, which could destroy the relay connected. Always use the Output Enable (23) to control the output signal.

RY1 - RY16 = Circuit Breaker Relay Coil (pins 7 and 8 of the Circuit Breaker).

Transfer Legends included

Each Circuit Breaker comes with a sheet of transfer legends, which can be simply applied (rubbed) onto the pushbutton. It is recommended to protect the transfer after application with a protective spray for photos or inkjet photo prints like **Clearstar ClearShield** and **ClearJet** (clearstarcorp.com), **Superfrog Frog Juice** (superfrog.com), **Lyson Print Guard** (Lyson.com), **Bulldog Ultra Coating** (bulldogproducts.com), **Liquitex Solivar varnish**, **Krylon Crystal Clear**, **UV-CLear** acrylic sprays, **Sureguard** (perfectiondistributing.com), and **Lacquer-Mat** (Lacquer-mat.com) photo lacquers. These protective sprays can be purchased at office equipment stores, camera stores, etc.

| | | | | | |
|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 25 | 30 | 35 | 40 | 45 |
| 50 | 60 | 70 | 80 | 90 | 7½ |
| 5 | 5 | 5 | 5 | 5 | 5 |
| 5 | 5 | 5 | 8 | 15 | 10 |