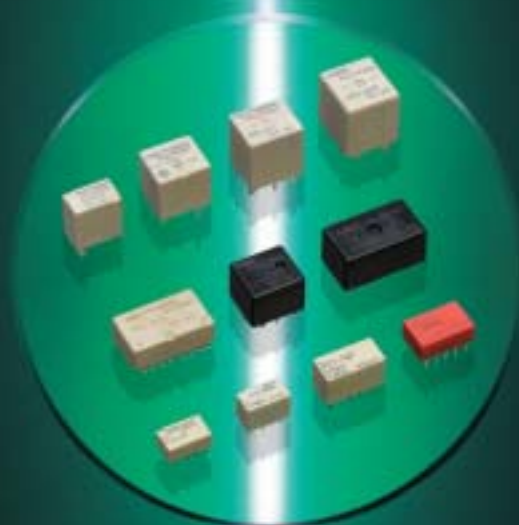




Devices thru Material Innovation

NEC/TOKIN

# Miniature Relays



Vol. 08



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# The NEC TOKIN's Miniature Relays have evolved in response to various demands.

Communication equipment, measurement instrument, FA equipment, electric home appliances and automotive electronics, and all the rest. In line with the increasing range of functions and downsizing of the various equipments, miniature relays have to respond to the demands of not only high performance and reliability, but also downsizing, low profile and environment resistance.

NEC TOKIN uses the state-of-the-art technologies based on the integration of mechatronics and electronics, and has timely released excellent products. These are Miniature Signal Relays and Power Relays. They are ultra miniature and lightweight, and are suitable for high density packaging. In 2009 NEC TOKIN reached the 4 billion mark in the number of relays shipped and is updating the record daily now.

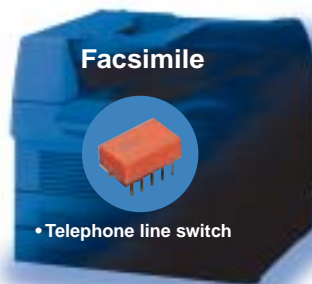
## For various Communication system, For various Automotive electronics system.

Miniature signal relays are used mainly in the field of telecommunications equipments such as the telephone switchboards. However, they are widely used also for the home appliance field such as home telephone, BS tuner and audio-video equipment, for the OA field such as printer and facsimile, and for FA field such as measurement equipment. Miniature power relays are used for various applications in automotive electronics field.

### Miniature Signal Relays

#### Applications

- Telephone switchboards
- Communication terminal equipment
- FA equipment
- Security and alarm equipment



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# Excellent performance and reliability recognized by customers all over the world.

The most important item of relays is “reliability”. NEC TOKIN’s Miniature Signal Relays are widely used for various communication equipments and measurement instruments which require high reliability of contact performance.

Meanwhile, NEC TOKIN also has successful records in the field of Miniature Power Relays, which have been recognized by many customers of automotive electronics with severe requirements for product quality.

These products are shipped to many customers all over the world from NEC TOKIN’s plants which have received the certifications of international standards of quality management ISO9001, ISO/TS16949 and environmental management ISO 14000.

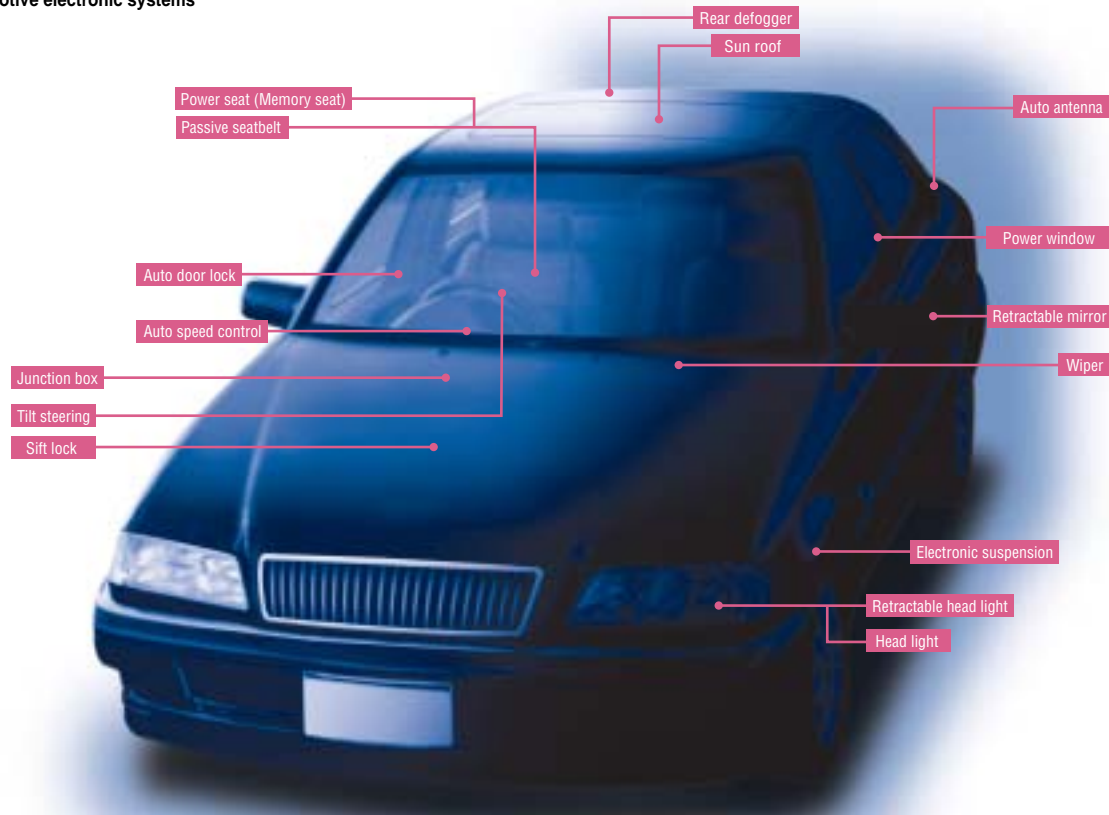
“Better Products, Better Service” — Reliability supporting the products which create comfortable life. That is NEC TOKIN’s Miniature Relay.

## Miniature Power Relays

Applications



### • Automotive electronic systems



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# Miniature Relays Lineup



NEC TOKIN provides the best-seller products already used for various applications, and variety of products such as a flat type for low profile mounting, a slim type for high density mounting, low power consumption type and excellent environment resistance type.

**<Feature>**

- Compact, lightweight, ultra-low profile with high density
- The low power consumption
- Extremely durable plastic sealing
- Small but high withstanding voltage
- Lineup of SMTs (surface mount type) also available

| Type of Relay            |                   | UA2/UB2   | UC2/UD2   | EA2  | EB2  |
|--------------------------|-------------------|---|---|--|--|
| Mounting height (mm)     |                   | 8.0±0.3/8.8max.   | 5.3±0.3/5.45max.  | 5.4max.  | 7.5/6.5, 5.6max.   |
| Mounting space (mm × mm) |                   | 5.7 × 10.6  | 6.5 × 10.6  | 9.2 × 14.2   | 11.5 × 14.3  |
| Features                 |                   | <ul style="list-style-type: none"> <li>• Small mounting size of slim package</li> <li>• Bellcore (2500 V) and FCC (1500 V) surge capability</li> <li>• Latching type available</li> <li>• Low power consumption type available</li> </ul> | <ul style="list-style-type: none"> <li>• Low profile type</li> <li>• Bellcore (2500 V surge coil to contacts) and FCC (1500 V) surge capability</li> <li>• Latching type available</li> <li>• Low power consumption type available</li> </ul> | <ul style="list-style-type: none"> <li>• Breakdown voltage 1000VAC FCC Part 68 compliant</li> <li>• Latching type available</li> </ul> | <ul style="list-style-type: none"> <li>• Surface mount type</li> <li>• Breakdown voltage 1000VAC, FCC Part 68 compliant</li> <li>• Latching type available</li> <li>• Reduced mounting space type available</li> </ul> |
| Contact arrangement      |                   | 2c  | 2c  | 2c   | 2c   |
| Maximum Contact          | Power             | 30W/37.5VA  |   | 30W/62.5VA   |  |
|                          | Voltage           | 220VDC/250VAC   |   | 220VDC/250VAC  |  |
|                          | Current [Working] | 1A  |   | 1A   |  |
| Coil                     | Operating power   | 100~230mW   |   | 100~200mW  |  |
|                          | Nominal voltage   | 3, 4.5, 5, 9, 12, 24V   |   | 3, 4.5, 5, 12, 24V   |  |

| Type of Relay            |                   | EC2   | EE2  | ED2   | EF2  |
|--------------------------|-------------------|---|--|---|--|
| Mounting height (mm)     |                   | 9.4max.   | 10.0~10.6max.  | 9.4max.   | 10.0~10.6max.  |
| Mounting space (mm × mm) |                   | 7.5 × 15.0  | 9.5(7.5) × 15.0  | 7.5 × 15.0  | 9.5(7.5) × 15.0  |
| Features                 |                   | <ul style="list-style-type: none"> <li>• 2500V surge coil to contacts</li> <li>• Latching type available</li> </ul> | <ul style="list-style-type: none"> <li>• Reduced mounting space type available</li> <li>• Surface mount type</li> <li>• 2500V surge coil to contacts</li> <li>• Latching type available</li> </ul> | <ul style="list-style-type: none"> <li>• Ultra low power consumption</li> <li>• 2500V surge coil to contacts</li> </ul> | <ul style="list-style-type: none"> <li>• Ultra low power consumption</li> <li>• Reduced mounting space type available</li> <li>• Surface mount type</li> <li>• 2500V surge coil to contacts</li> </ul> |
| Contact arrangement      |                   | 2c  | 2c   | 2c  | 2c   |
| Maximum Contact          | Power             | 60W/125VA (UL, CSA rating)  |  | 30W/62.5VA  |  |
|                          | Voltage           | 220VDC/250VAC   |  |   |  |
|                          | Current [Working] | 2A  |  | 1A  |  |
| Coil                     | Operating power   | 100~230mW   |  | 30~70mW   |  |
|                          | Nominal voltage   | 3, 4.5, 5, 9, 12, 24V   |  | 1.5, 3, 4.5, 5, 9, 12, 24V  |  |








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NEC TOKIN provides various types such as low profile, small mounting area and low power consumption, while realizing large capacity.

**<Feature>**

- Large capacity for high power switching
- Flux tight housing suitable for automatic soldering dip
- Semi-customizable for use in all types of circuitry, including car electronic systems
- Washable plastic case (sealed type)
- Lineup of miniature twin relays also available
- Reflow soldering type available

| Type of Relay            |                   | EU2   | EX2  | EX1   | ET2   | ET1   |
|--------------------------|-------------------|---|--|---|---|---|
| Mounting height (mm)     |                   | 8.0max.   | 14.2max.   | 14.2max.  | 11.0max.  | 11.0max.  |
| Mounting space (mm × mm) |                   |  12.2 × 21.0   |  12.6 × 14.1  |  8.0 × 12.6  |  13.3 × 22.5  |  13.3 × 14.5   |
| Features                 |                   | <ul style="list-style-type: none"> <li>• Ultra low profile SMD twin relay for motor reversible control</li> <li>• Light weight</li> <li>• Reflow soldering available</li> </ul> | <ul style="list-style-type: none"> <li>• Ultra miniature twin relay for motor reversible control</li> <li>• Light weight</li> <li>• Small mounting area</li> </ul> | <ul style="list-style-type: none"> <li>• Ultra miniature single relay for motor control</li> <li>• Light weight</li> <li>• Small mounting area</li> </ul> | <ul style="list-style-type: none"> <li>• Miniature twin relay for motor reversible control</li> <li>• Low profile</li> <li>*ET2F; High heat resistance</li> </ul> | <ul style="list-style-type: none"> <li>• Miniature single relay for motor, heater &amp; solenoid control</li> <li>• Low profile</li> <li>*ET1F; High heat resistance</li> </ul> |
| Contact arrangement      |                   | 1c × 2  | 1c × 2   | 1c  | 1c × 2  | 1c  |
| Maximum Contact          | Power             | 480W  | 480W   |   | 400W  |   |
|                          | Voltage           | 16VDC   | 16VDC  |   | 16VDC   |   |
|                          | Current [Working] | 30A   | 30A  |   | 25A   |   |
| Coil                     | Operating power   | 960mW   | 900mW  |   | 640mW   |   |
|                          | Nominal voltage   | 12  | 12   |   | 12  |   |

| Type of Relay            |                   | EP2   | EP1   | EP1K  | EN2  | EQ1  | EM1  |
|--------------------------|-------------------|---|---|---|--|--|--|
| Mounting height (mm)     |                   | 16.5max.  | 16.5max.  | 17.5max.  | 17.0max.   | 15.4max.   | 16.5max.   |
| Mounting space (mm × mm) |                   |  16.7 × 24.3   |  16.7 × 15.1                         |  16.7 × 15.1   |  16.5 × 33.5                             |  15.0 × 21.8                                      |  12.9 × 14.9  |
| Features                 |                   | <ul style="list-style-type: none"> <li>• Twin relay for motor reversible control</li> <li>• Symmetrical structure</li> <li>*EP2F; High heat resistance</li> </ul> | <ul style="list-style-type: none"> <li>• Single relay for motor control</li> <li>*EP1F; High heat resistance</li> </ul> | <ul style="list-style-type: none"> <li>• Large capacity single relay for motor, heater &amp; solenoid control</li> <li>• Reflow soldering available</li> <li>*High heat resistance</li> </ul> | <ul style="list-style-type: none"> <li>• Twin relay for motor reversible control</li> <li>• Symmetrical structure</li> </ul> | <ul style="list-style-type: none"> <li>• Single relay for motor &amp; lamp control</li> <li>• Small size &amp; Light weight</li> </ul> | <ul style="list-style-type: none"> <li>• Large capacity single relay for lamp, condenser &amp; motor control</li> <li>• Reflow soldering available</li> <li>*High heat resistance</li> </ul> |
| Contact arrangement      |                   | 1c × 2  | 1c  | 1c  | 1c × 2   | 1a,1c  | 1u   |
| Maximum Contact          | Power             | 480W  |   | 640W  | 560W   | 480W   | 640W   |
|                          | Voltage           | 16VDC   |   | 16VDC   | 16VDC  | 16VDC  | 16VDC  |
|                          | Current [Working] | 30A   |   | 40A   | 35A  | 30A  | 40A  |
| Coil                     | Operating power   | 480~640mW   |   | 640mW   | 640~1150mw   | 640~1000mW   | 640mW  |
|                          | Nominal voltage   | 12V   |   | 12V   | 12V  | 12V  | 12V  |



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# The production bases responsible for the superb quality of NEC TOKIN's Miniature Relays.

NEC TOKIN has two production bases — NEC TOKIN Shiroishi Operations and NEC TOKIN Electronics (Philippines) Inc. — that ensure a constant and stable supply of high-quality and highly reliable miniature relays using the most advanced equipment available. Both plants have received ISO9001, ISO/TS16949 and ISO14001 certification.

## NEC TOKIN Shiroishi Operations

This is a R&D and production site responsible for developing and designing new products. There is abundant expertise and experience in manufacturing technology. The production line employs state-of-the-art robots and image processing technology to ensure that NEC TOKIN miniature relays achieve maximum efficiency and quality.



## NEC TOKIN Electronics (Philippines) Inc.

Established in 1997, this mass production factory boasts the most advanced equipment. The intricate construction of miniature relays requires the highest level of precision for processing and assembly. In order to ensure high quality, the production line is fully automated. The miniature relays produced here are shipped to customers all over the world.



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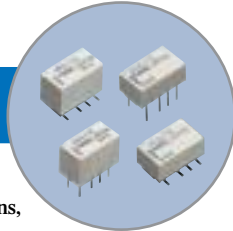
# NEC TOKIN Miniature Relays keep on evolving.

In order to respond to various needs from customers, NEC TOKIN is creating new products through continuous efforts for downsizing, weight saving, high performance, change of mounting method, and so forth

Ultra small signal relays

## U Series

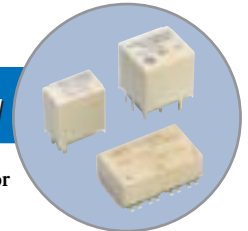
The world's smallest class signal relay for use in telecommunications, FA control, and measuring equipment. UA&UB relays are the ultra-compact type with a mounting area of 60mm<sup>2</sup>. UC&UD relays are the ultra-compact type with low profile of 5.45mm.



Miniature power relays for Automotive electronic systems

## EX1, EX2&EU2 relay

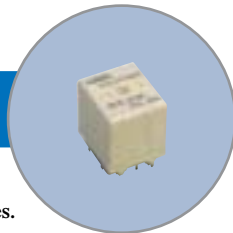
These relays are suitable for motor reversible control such as power window and door lock, etc. EX1&EX2 relays are the world's smallest class of mounting area. EU2 relay is the surface mount twin relay with the world's lowest profile (7.8mm).



Miniature power relays for Automotive electronic systems

## EP1K relay

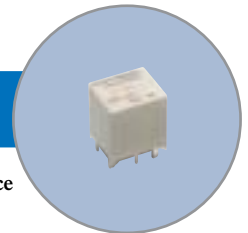
EP1K relay is a high heat resistance relay for junction boxes. It is suitable for control of heaters and fans, etc. It was developed based on the EP1 relay, and the performance of carrying current is about 10A larger than the EP1 relay.



Miniature power relays for Automotive electronic systems

## EM1 relay

EM1 relay is a high heat resistance relay for junction boxes. It is suitable for large inrush current loads such as lamps and condensers, or heaters and fans. Inrush current of 100A and carrying current of 50A are achieved.



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