

| | |
|---|-------------|
| Product Safety Precautions | Page |
| Safety Precautions | Z27 |
| In-House Standard Test Methods | Z28 |
| General Tolerances | Z29 |
| Materials & Conversions | |
| Plastics & Elements | Z30 |
| Temperature | Z30 |
| Linear Dimensions | Z30 |
| Force & Torque | Z30 |
| Plating Thickness | Z30 |
| Weight | Z30 |
| Electrical Ratings | |
| Rerating Current | Z31 |
| Inductive DC Loads; TV Ratings | Z32 |
| Operating Range & Dual Ratings | Z33 |
| Lamps & LEDs | |
| Rerating | Z34 |
| Application Considerations | Z35 |
| Ballast Resistor Calculations & Recommendations | Z36 |
| Processing Data | |
| Processing Recommendation Guide | Z38 |
| Process Sealed Switches; Automated Cleaning Specifications | Z39 |
| Manual Solder – Profiles A, B | Z39 |
| Wave Solder for Through Hole – Profiles A, B | Z40 |
| Reflow Solder for SMT – Profiles A, B | Z40 |
| Standards & Approvals | |
| UL Recognition, cULus Recognition, CSA Certification | Z41 |
| VDE, ISO, IP | Z45 |
| Terms & Acronyms | |
| Terms & Acronyms | Z46 |
| Federal Supply Code | Z51 |
| Product Overview | |
| Ultra-Miniature, Subminiature, Miniature, Specialty, Illuminated, Standard & High Capacity | Z52 |
| Index by Model Number | Z54 |

Toggle

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Z
Supplement

NKK SWITCHES PRODUCT SAFETY PRECAUTIONS

Read all specifications, instructions and precautions to ensure proper use when selecting and using products. NKK Switches does not accept liability for any problems due to incorrect usage.

Although NKK Switches' products are designed and manufactured in accordance with the highest quality standards, it is nevertheless possible for switch failure to occur as a result of improper or unintended use that could result in performance degradation, short circuits, open circuit failure, and semiconductor failures. To prevent possible injury or property damage, it is recommended to incorporate circuits or devices to protect against the failure of products and the malfunction of equipment design. Confirm that NKK Switches' products are wired and installed properly.

1. Voltages and Current

Check the specifications provided for the selected series and do not exceed the parameters for rated voltages and current recommendations.

Certain types of load may lead to large surge currents or reverse voltages. Select switches with the appropriate ratings to suit the type of load. Using an incorrect switch may result in abnormal wear, seizing, or contact failure.

Do not use switches under conditions that exceed their rated voltage or current specifications, as it may result in smoke, fire, or other malfunction. If there is a risk of exceeding rated voltage or current, precautions should be in place, such as appropriate protective circuits.

2. Usage Environment

Take account of the particular environment and conditions before selecting products.

Products do not feature sealed construction unless specified as waterproof. Sealed, or waterproof products are intended as panel sealed and cannot be used underwater or submersed in oil. Use in environments where the product may be subject to splashing liquids or dust may result in contact failure.

The use of waterproof caps is recommended where dirt, water, oil, or other substances may accumulate on the moving parts of panel surfaces.

Switches that are rarely operated should be actuated periodically to prevent potential problems, such as lubricants hardening and contact degradation.

Do not use switches in an environment where flammable gases are present. Heat generated by switch operation may lead to ignition or explosion.

Switch durability (service life) may vary significantly, depending on operating conditions. Before use, confirm compatibility of the switch selected for the application under actual usage conditions. Do not exceed the number of recommended operation cycles. Continuing to use switches with degraded performance may result in insulation failure, contact seizing, contact failure, damage, or burnout.

The resin used for products has been specially selected in accordance with the standards of NKK Switches. Do not use where there may be a risk of combustion unless appropriate fire prevention measures have been taken.

3. Soldering Temperature

Soldering times and temperatures should not exceed recommended ranges for each specific series.

Do not operate switches during or immediately after soldering (within 1 to 2 minutes), as it may lead to melting of resin components. Do not apply force to the terminals or lead wires.

4. External Force

Handle switches with care, as they may become damaged if impacted or dropped, whether loose or in packaging.

Operate switches by applying force in the correct direction.

Do not apply excessive force. Note that subjecting products to undue force may deform the terminals or cause contact failures or malfunctions. Do not subject the operating parts to impact – for example, with use of screwdrivers, wrenches, or other tools.

Safety Precautions

5. Storage

Avoid storing devices in hot or humid locations. Products should be stored at temperatures of about 25°C (15°C – 35°C) and relative humidity of about 55% (25% – 85%).

Avoid storing in locations where corrosive gases are present. Store products away from exposure to direct sunlight.

Products should be stored in original packaging to prevent sulfurization of terminals. Use products as soon as possible (within one year of delivery).

Avoid placing parts under heavy objects.

In-House Standard Test Methods

Ratings and performance figures provided in this catalog are based on NKK's In-House Standard Test Methods. Unless specifically stated otherwise, they are derived from tests performed within the standard atmospheric conditions described below. Note that these do not constitute guarantees for all standard atmospheric condition ranges.

Initial Values

- Ambient temperature: 15°C – 35°C (59°F – 95°F)
- Relative humidity (RH): 25% – 85%
- Atmospheric pressure (kPa): 86 – 106

Ratings and performance figures are concluded from individual tests and do not authorize warranties if the switches experience extended continuous operation at either extreme high or extreme low ends of the ranges. Optimal performance falls within the range of environmental tests. Contact factory if more details are needed.

For specifications not described in this catalog or for using NKK Switches' products in special environments, contact the factory.

Contact Resistance (Initial Values)

At a value determined by the individual specification, voltage declines and resistances are calculated.

The resistance value shall be at the maximum value of the individual specification.

Insulation Resistance (Initial Values)

A voltage of the individual specification shall be applied. The resistance value is at the maximum value of the individual specification. Devices shall be tested between terminals and between individual terminals and frame.

Dielectric Strength (Initial Values)

Voltage of the individual specification shall be applied. There shall be no abnormality such as short-circuit, dielectric breakdown, or leakage of current, etc. Devices shall be tested between terminals and between individual terminals and frame.

Vibration

Testing shall be executed with conditions that include a vibration frequency and amplitude outlined by the individual specification. There shall be no mechanical failure, no looseness of any part, no disassembled parts, with no electrical interruption.

Shock

Testing shall be executed with conditions to include a shock wave, shock wave time outlined by the individual specification. There shall be no mechanical failure, no looseness of any part, no disassembled parts, with no electrical interruption.

Corrosion

Testing shall be executed with the conditions outlined by the individual specification. There shall be no impairment or deterioration. Insulation resistance and dielectric strength must meet the requirement defined by the individual specification.

Moisture Proof

Testing shall be executed with conditions including temperature and relative humidity outlined by the individual specification. There shall be no failure of mechanical operation immediately after the test. Insulation resistance and dielectric strength must meet the requirement defined by the individual specification.

Heat Resistance (Operating)

Test parts are kept in a thermostatic oven at a temperature and condition outlined by the individual specification and shall make and break the electrical endurance test up to maximum number of operations. There shall be no failure of operation. Contact resistance, insulation resistance and dielectric strength must meet the requirement defined in the individual specification.

Heat Resistance (Storage)

Test parts are kept in the thermostatic oven at a temperature determined by the individual specification. There shall be no electrical or mechanical failure. Contact resistance, insulation resistance and dielectric strength must meet the requirement outlined by the individual specification.

Cold Proof (Operating)

Test parts shall make and break the operational test without load, in the thermostatic oven at a temperature defined by the individual specification. There shall be no electrical or mechanical failure. Contact resistance, insulation resistance and dielectric strength must meet the requirement outlined by the individual specification.

Cold Proof (Storage)

Test parts are kept in the thermostatic oven at a temperature determined by the individual specification. There shall be no electrical and mechanical failure. Contact resistance, insulation resistance and dielectric strength must meet the requirement outlined by the individual specification.

Electrical Endurance

Test parts shall make and break the operational test at voltage, current and load determined by the individual specification. There shall be no electrical or mechanical failure. Contact resistance, insulation resistance and dielectric strength must meet the requirement outlined by the individual specification.

Mechanical Endurance

Test parts shall make and break the operational test at a voltage and current determined by the individual specification without load. There shall be no electrical or mechanical failure. Contact resistance, insulation resistance and dielectric strength must meet the requirement outlined by the individual specification.

Usage Precautions

The operating temperature (humidity) ranges are guaranteed by evaluations based on the individual series specifications, and do not constitute warranties for extended continuous operation at either extreme high or low ends of the operating temperature range, or for constant operation at that temperature (or humidity).

During actual use, switches may be subjected to circumstances not tested in the laboratory. Before operating, confirm that actual usage will occur within operating environments and load conditions as outlined in recommended criteria.

Operation frequency and speed will affect switch performance. Switches may exhibit contact failure, seize, or sustain damage if operated too infrequently, very slowly or very quickly. Optimum performance may not be achieved for certain operating frequencies or operating speeds. Contact the factory if more details are needed.

GENERAL TOLERANCES

| General Tolerances Unless Otherwise Specified | Range | Dimensions |
|---|------------------------|------------|
| | Up to 6mm | ±0.3 |
| | Over 6mm & up to 30mm | ±0.5 |
| | Over 30mm & up to 50mm | ±0.8 |