Series MR  Miniature Power Level Rotaries

General Specifications

Electrical Capacity (Resistive Load)

For MRX: 2A @ 125V AC or 1A @ 30V DC
For MRY: For MRY106G: 0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Note: See Supplement Index to find explanation of operating range.
For all other MRY models: 3A @ 125V AC or 2A @ 30V DC
For MRT: For MRT22: 10A @ 125V AC or 4A @ 30V DC
For MRT23: 5A @ 125V AC or 3A @ 30V DC

Other Ratings

Contact Resistance: 10 milliohms maximum for MRX, MRY, & MRT; 20 milliohms maximum for MRY106G
Insulation Resistance: 100 megohms minimum @ 500V DC for MRX & MRY
Dielectric Strength: 200 megohms minimum @ 500V DC for MRT
Mechanical Life: 15,000 operations minimum
Electrical Life: 7,500 operations minimum
Range of Operating Torque: 0.03 ~ 0.15Nm for MRX; 0.02 ~ 0.10Nm for MRY; 0.02 ~ 0.05Nm for MRT
Contact Timing: Nonshorting (break-before-make)
MRX: Self-cleaning, sliding contact; MRY: Rotary contactor dish; MRT: Butt contacts
Indexing: 45° for MRX; 60° for MRY, 120° for MRT22; 60° for MRT23

Materials & Finishes

Shaft: Brass with nickel plating
Stopper Plate: Steel with zinc plating for MRX & MRY
Bushing/Housing: Brass with nickel plating
Movable Contacts: Silver alloy for MRX & MRT; copper with silver plating for MRY106;
copper with gold plating for MRY106G
End Contacts & Terminals: Silver alloy & copper with silver plating for MRX & MRT; silver alloy plus brass with silver plating
for MRY106; silver alloy with gold plating for MRY106G
Common Contacts & Terminals: Copper with silver plating for MRX, MRY106 & MRT22; brass with gold plating for MRY106G;
brass with silver plating for MRT23
Base: Phenolic resin

Environmental Data

Operating Temperature Range: –10°C through +70°C (+14°F through +158°F)
Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in
1 minute; 3 right angled directions for 2 hours
Shock: 50G (490m/s^2) acceleration (tested in 3 right angled directions, with 3 shocks in each direction)

Installation

Mounting Torque: .686Nm (6.08 lb-in)
Cap Installation Force: 19.6 ~ 29.4N (4.41 ~ 6.61 lbf)

Standards & Certifications

UL: File No. E44145 - Recognized only when ordered with marking on switch.
Add “/U” or “/CUL” before dash in part number to order UL recognized switch.
MRT22 models recognized at 10A @ 125V AC; MRT23 models recognized at 5A @ 125V AC
Distinctive Characteristics

Positive detent mechanism for distinct feel and audible feedback.

Metal bushing and housing construction increases durability.

Adjustable stopper plate allows 2-8 position settings.

High contact reliability achieved by the self-cleaning contact mechanism.

Break-before-make contact timing with various mechanism types: sliding contacts in MRX, contactor dish in MRY, and butt contacts in MRT models.

Terminal types include PC-turret for MRX, turret for MRY, and solder lug for MRT models.

Molded-in PC-turret and turret terminals prevent entry of flux and other contaminants.
**Series MR**

**Miniature Power Level Rotaries**

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### TYPICAL SWITCH ORDERING EXAMPLE

<table>
<thead>
<tr>
<th>MR</th>
<th>X</th>
<th>108</th>
<th>A</th>
</tr>
</thead>
</table>

#### Actuators & Terminals

- **X** Shaft Actuated with PC-Turret Terminals
- **Y** Shaft Actuated with Turret Terminals
- **T** Shaft Actuated with Solder Lug Terminals

#### Poles & Circuits

<table>
<thead>
<tr>
<th>108</th>
<th>204</th>
<th>402</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP with 2-8 Positions</td>
<td>DP with 2-4 Positions</td>
<td>4P with 2 Positions</td>
</tr>
</tbody>
</table>

#### Knobs

- **A** Plain Black
- **B** Small Color Tipped
- **C** Large Color Tipped

#### Colors

- **No Code** Black
- **A** Black
- **B** White
- **C** Red
- **E** Yellow
- **F** Green
- **G** Blue
- **H** Gray

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**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

**MRX108-A**

- Shaft Actuated with Plain Black Knob
- SP with 2-8 Adjustable Positions
- PC-Turret Terminals

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**IMPORTANT:**

MRT Switches are supplied without UL & cULus marking unless specified. UL & cULus recognized only when ordered with marking on the switch.

Specific models, ratings, & ordering instructions are noted on the General Specifications page.

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**ACTUATORS & TERMINALS**

- **X** Shaft Actuated with PC-Turret Terminals
- **Y** Shaft Actuated with Turret Terminals
- **T** Shaft Actuated with Solder Lug Terminals

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**SPECIFICATIONS**

- **MRX-22** (5.0)
- **MRX-23** (5.0)
- **MRX-106-22** (5.0)
- **MRX-106G-22** (5.0)
- **MRX-106-23** (5.0)
- **MRX-106G-23** (5.0)

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**www.nkkswitches.com**
POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Number of Positions</th>
<th>Stopper Settings</th>
<th>Number of Terminals</th>
<th>Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>MRX108</td>
<td>2-8</td>
<td>2, 3, 4, 5, 6, 7, 8</td>
<td>1 COM, 8 LOAD</td>
<td><img src="image1" alt="Schematics" /></td>
</tr>
<tr>
<td></td>
<td>MRY106</td>
<td>2-6</td>
<td>2, 3, 4, 5, 6</td>
<td>1 COM, 6 LOAD</td>
<td><img src="image2" alt="Schematics" /></td>
</tr>
<tr>
<td></td>
<td>MRY106G</td>
<td></td>
<td></td>
<td></td>
<td><img src="image3" alt="Schematics" /></td>
</tr>
<tr>
<td>DP</td>
<td>MRX204</td>
<td>2-4</td>
<td>2, 3, 4</td>
<td>2 COM, 8 LOAD</td>
<td><img src="image4" alt="Schematics" /></td>
</tr>
<tr>
<td>DPDT</td>
<td>MRT22</td>
<td>2</td>
<td>ON-NONE-ON</td>
<td>2-3 2-1 5-6 5-4</td>
<td><img src="image5" alt="Schematics" /></td>
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<tr>
<td></td>
<td>MRT23</td>
<td>3</td>
<td>ON-OFF-ON</td>
<td>2-OPEN 2-1 OPEN 5-4</td>
<td><img src="image6" alt="Schematics" /></td>
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<tr>
<td>4P</td>
<td>MRX402</td>
<td>2</td>
<td>1 &amp; 2</td>
<td>4 COM, 8 LOAD</td>
<td><img src="image7" alt="Schematics" /></td>
</tr>
</tbody>
</table>

POSITION SETTING FOR MRX & MRY MODELS

Each switch is supplied with the stopper set for the maximum number of positions allowed for that model. Prior to installation, the desired position setting should be made. Contact factory for continuous rotation.

1. Using the actuator knob, turn the shaft counterclockwise to the extreme left. If the shaft is not turned to this extreme position where the white line on the knob points to the number 1 position shown on the side of the switch, proper setting cannot be achieved.
2. Remove the knob from the shaft and loosen the nut far enough to allow raising the stopper plate for resetting to the desired position.
3. Note the position numbers on the side of the switch; these correspond to the terminal numbers and stopper holes. Insert the stopper in the hole numbered for the maximum desired number of stop settings. Satisfactory switch functioning cannot be assured if the stopper plate is not properly positioned.
4. Tighten the nub (beveled side up) firmly against the stopper plate.

TYPICAL SWITCH DIMENSIONS

Single, Double & Four Pole

MRX • PC-Turret Terminals
### TYPICAL SWITCH DIMENSIONS

**MRY • Turret Terminals**

<table>
<thead>
<tr>
<th>Single Pole</th>
<th>Double Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MRY106</strong></td>
<td><img src="image1" alt="Diagram" /></td>
</tr>
</tbody>
</table>

**MRT • Solder Lug Terminals**

<table>
<thead>
<tr>
<th>Single Pole</th>
<th>Double Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MRT22</strong></td>
<td><img src="image2" alt="Diagram" /></td>
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</tbody>
</table>

**MRT23**

<table>
<thead>
<tr>
<th>Single Pole</th>
<th>Double Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
</tbody>
</table>

**Typical Dimensions**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6 P0.75</td>
<td>0.22</td>
</tr>
<tr>
<td>Keyway</td>
<td>.043</td>
</tr>
<tr>
<td>M6 P0.75</td>
<td>0.295</td>
</tr>
<tr>
<td>Keyway</td>
<td>.043</td>
</tr>
</tbody>
</table>

**NKK Switches**

![NKK Switches Logo](image5)
PC FOOTPRINTS FOR MRX SINGLE, DOUBLE, & FOUR POLE

Single Pole

Double Pole

Four Pole

KNOBS

A AT433
Plain Black

B AT4103 Small
Color Tipped

C AT4104 Large
Color Tipped

Material: Polyacetal
Color: Black only

Base Material: Polyester
Base Color: Black
Polyamide Tip
Colors: A, B, C, E, F, G, H

Base Material: Polyester
Base Color: Black
Polyamide Tip
Colors: A, B, C, E, F, G, H

Color Codes: A Black B White C Red E Yellow F Green G Blue H Gray

PANEL CUTOUTS & MAXIMUM EFFECTIVE PANEL THICKNESS

Without Keyway

With Keyway

Maximum Effective Panel Thickness

With Standard Hardware: MRX & MRY .095” (2.4mm); MRT .106” (2.7mm)
Without Locking Ring: MRX & MRY .126” (3.2mm); MRT .138” (3.5mm)