Series MR

Half-Inch Diameter Process Sealed Rotaries

General Specifications

Electrical Capacity (Resistive Load)

For MRAN:	250mA @ 125V AC
For MRF or MRK:	0.4VA maximum @ 28V AC/DC maximum
	(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
	Note: Find additional explanation of operating range in Supplement section.

Other Ratings

Contact Resistance:	10 milliohms maximum for MRAN; 50 milliohms maximum for MRF & MRK
Insulation Resistance:	100 megohms minimum @ 500V DC
Dielectric Strength:	1,000V AC minimum for 1 minute minimum for MRAN
	500V AC minimum for 1 minute minimum for MRF & MRK
Mechanical Life:	30,000 operations minimum
Electrical Life:	10,000 operations minimum
Range of Operating Torque:	0.02 ~ 0.07Nm for MRAN; 0.005 ~ 0.02Nm for MRF & MRK
Contact Timing:	Nonshorting (break-before-make)
	MRAN – self-cleaning, sliding contact; MRF & MRK – self-cleaning, rotary contactor disk
Indexing:	30°

Materials & Finishes

Shaft:	Brass with nickel plating
Stopper Plate:	Steel with zinc plating for MRAN & MRK; polyamide cover with stopper for MRF
Bushing/Housing:	Zinc alloy with zinc plating
Movable Contacts:	Copper with silver plating for MRAN; phosphor bronze with gold plating for MRF & MRK
End Contacts & Terminals:	Brass with silver plating for MRAN; phosphor bronze with gold plating for MRF & MRK
Common Contacts & Terminals:	Brass with silver plating for MRAN; phosphor bronze with gold plating for MRF & MRK
Base:	Diallyl phthalate for MRAN; fiberglass reinforced polyamide for MRF & MRK

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)
Sealing:	MRK model meets IP67 of IEC 60529 standards

Installation

Mounting Torque:	.686Nm (6.08 lb•in)

Processing

Soldering Time & Temperature:	Wave Soldering for MRAN: See Profile A in Supplement section.
	Wave Soldering for MRF & MRK: See Profile B in Supplement section.
	Manual Soldering for MRAN: See Profile A in Supplement section.
	Manual Soldering for MRF & MRK: See Profile B in Supplement section.
Cleaning:	Automated cleaning recommended. Stopper plate, as well as washers for MRAN & MRK, must be in place to maintain automated cleaning. See Cleaning specifications in Supplement section.

Standards & Certifications

MRAN, MRF, & MRK models have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

NKK SWITCHES

10/10/23

Distinctive Characteristics

Low profile body of MRF model accommodates space limitations required for PCB mounting. For the MRAN and MRK bushing mount models, the range of behind panel body depths is .323" to .661" (8.2mm to 16.8mm).

Positive detent mechanism for distinct feel and audible feedback.

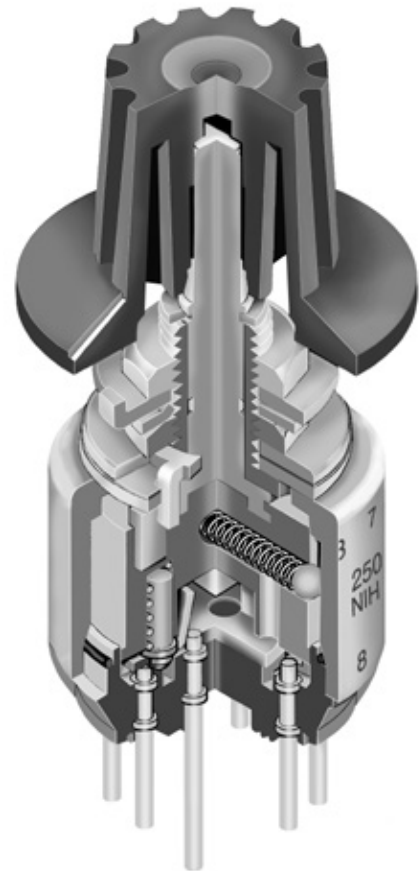Metal bushing and housing construction increases durability.

Adjustable stopper plate allows 2–12 position settings.

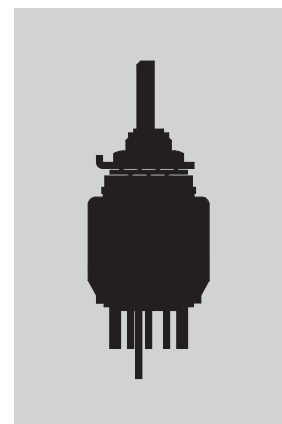High contact reliability achieved by the self-cleaning contact mechanism.

Break-before-make contact timing with sliding contacts in MRAN and rotary contactor disk in MRF and MRK models.

Interior housing seal and molded-in PC terminals, plus shaft rubber o-ring on MRAN and MRK and polyamide cover on MRF model, allow cleaning after automated soldering.

MRK model meets IP67 of IEC 60529 specifications (similar to NEMA 4 & 13).

Actual Size

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

G Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

Toggles
Rockers
Pushbuttons
Illuminated PB
Programmable
Keylocks
Rotaries **G**
Slides
Tactiles
Tilt
Touch
Indicators
Accessories
Supplement

TYPICAL SWITCH ORDERING EXAMPLE

MR   **AN**   **206**   —   **A**   ☐

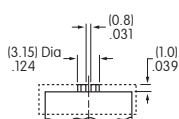### Actuators & Terminals

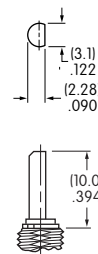|	
AN	Shaft Actuated with PC Terminals
F	Low Profile Screwdriver Actuated with PC Terminals
K	Low Profile Shaft Actuated with PC Terminals

Poles & Circuits

112	SP with 2-12 Positions
206	DP with 2-6 Positions
403	4P with 2-3 Positions

Knobs

A	Plain Black
B	Small Color Tipped
C	Large Color Tipped

Colors

For Plain Knob	
No Code	Black

For Color Tipped	
A	Black
B	White
C	Red
E	Yellow
F	Green
G	Blue
H	Gray

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MRAN206-A

- Shaft Actuated with Plain Black Knob
- DP with 2-6 Adjustable Positions
- PC Terminals

ACTUATORS & TERMINALS

AN   **Shaft Actuated with PC Terminals**

(3.1) .122
(2.28) .090
(3.5) .138
(10.0) .394
(0.5) .020
Thk = (0.25) .010
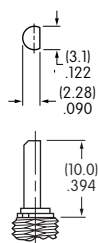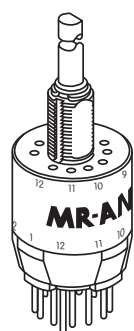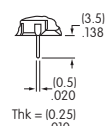
Shaft   Terminal

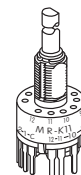**F**   **Low Profile Screwdriver Actuated with PC Terminals**

(0.8) .031
(3.15) Dia .124
(1.0) .039
(3.5) .138
(0.5) .020
Thk = (0.25) .010
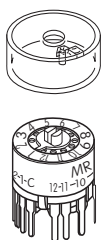
Slotted for Screwdriver   Terminal
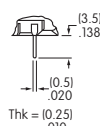
K   **Low Profile Shaft Actuated with PC Terminals**

(3.1) .122
(2.28) .090
(3.5) .138
(10.0) .394
(0.5) .020
Thk = (0.25) .010

Shaft   Terminal

NKK SWITCHES

Toggles
Rockers
Pushbuttons
Illuminated PB
Programmable
Keylocks
G Rotaries
Slides
Tactiles
Tilt
Touch
Indicators
Accessories
Supplement

Half-Inch Diameter Process Sealed Rotaries

Series MR
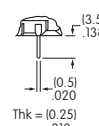
POLES & CIRCUITS

Pole	Model	Number of Positions	Stopper Settings	Number of Terminals	Schematics
SP	MRAN112	2–12	2, 3, 4, . . . 12	1 COM, 12 LOAD	
	MRF112	2–12	2, 3, 4, . . . 12	1 COM, 12 LOAD	
	MRK112	2–12	2, 3, 4, . . . 12	1 COM, 12 LOAD	
DP	MRAN206	2–6	2, 3, 4, 5, 6	2 COM, 12 LOAD	
	MRF206	2–6	2, 3, 4, 5, 6	2 COM, 12 LOAD	
	MRK206	2–6	2, 3, 4, 5, 6	2 COM, 12 LOAD	
4P	MRAN403	2–3	2, 3	4 COM, 12 LOAD	
	MRF403	2–3	2, 3	4 COM, 12 LOAD	
	MRK403	2–3	2, 3	4 COM, 12 LOAD	

POSITION SETTING FOR MRAN, MRF, & MRK 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.

MRF Models

1. Remove the protective cover from the switch body.
2. Turn the shaft counterclockwise to the extreme left by using a screwdriver.
3. Inside the cover is a magnifying lens which would be positioned over the number which is to be the maximum position used; when the cover is then snapped into the switch, the projection beside the lens fits into the correct hole for setting the stop.
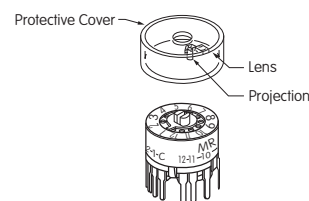
MRK & MRAN Models

1. Using the actuator knob, turn the shaft counterclockwise to the extreme left. If the shaft is not turned counterclockwise to the extreme left, proper setting cannot be achieved. At this extreme position, the white line on the knob points to the number 1 position shown on the side of the switch.

2. Remove the knob from the shaft and loosen the nut far enough to allow raising the stopper plate, plus washer, 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 nut (beveled side up) firmly against the stopper plate.

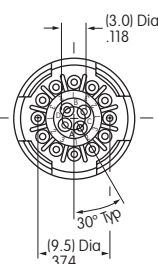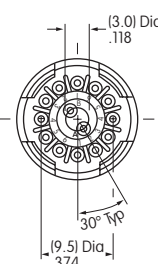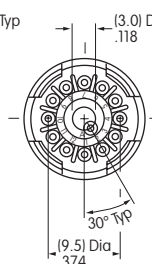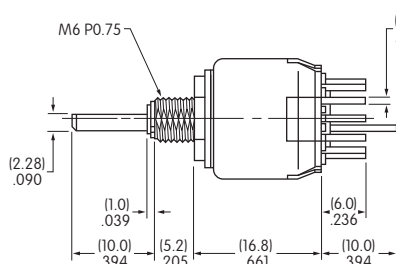### Standard Mounting Hardware Packaged Loose with Each Switch:

Hex Face Nut
Locking Ring
Lockwasher
Rubber Ring (MRK)

Factory Assembled:

Hex Nut
Stopper Plate
Rubber Washer

Toggles
Rockers
Pushbuttons
Illuminated PB
Programmable
Keylocks
Rotaries G
Slides
Tactiles
Tilt
Touch
Indicators
Accessories
Supplement
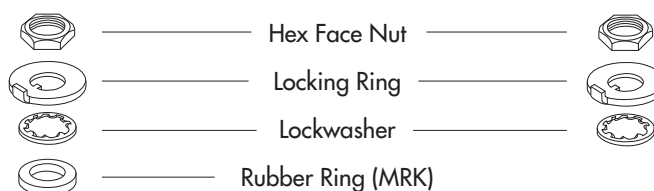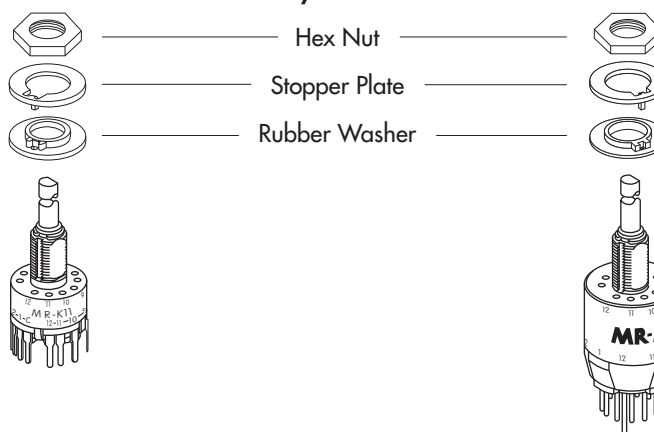
TYPICAL SWITCH DIMENSIONS

MRAN • PC Terminals

1 Pole   **2 Pole**   **4 Pole**

MRAN112

M6 P0.75

(2.28) .090

(3.0) .122

(16.0) Dia .630

(1.0) .039

(10.0) .394

(5.2) .205

(16.8) .661

(6.0) .236

(10.0) .394

(0.8) Dia Typ .031

(3.0) Dia .118

(9.5) Dia .374

30° Typ

Keyway
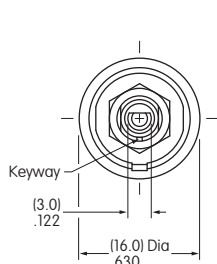
MRF • PC Terminals

1 Pole   **2 Pole**   **4 Pole**

MRF403

(0.8) .031

Cover

(0.25) Typ .010

(12.0) Dia .472

(0.5) Typ .020

(4.2) .165

(8.2) .323

(3.5) .138

(14.0) Dia .551

15° 30°

15° Typ

(12.6) Dia .496
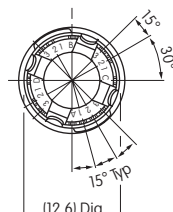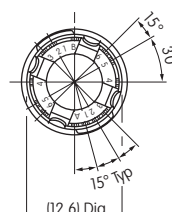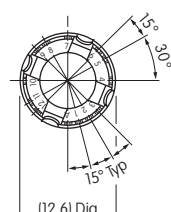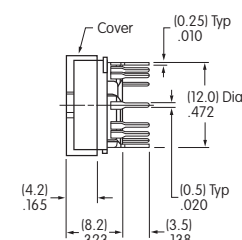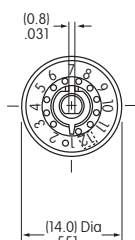
MRK • PC Terminals

1 Pole   **2 Pole**   **4 Pole**

MRK112

M6 P0.75

(0.25) Typ .010

(12.0) Dia .472

(0.5) Typ .020

(2.28) .090

(3.1) .122

(10.0) .394

(5.5) .217

(10.1) .398

(3.5) .138

Keyway

15° 30°

15° Typ

(12.6) Dia .496
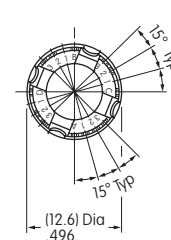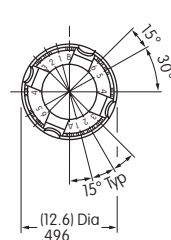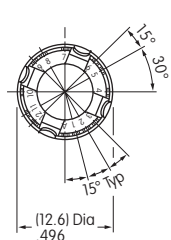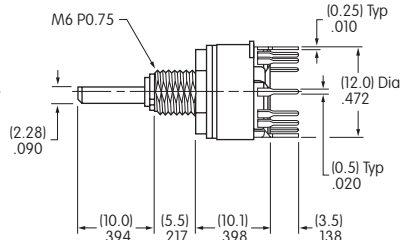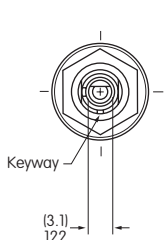
MRK devices are designed to be panel mounted. Installation without panel mounting will affect reliability.

FOOTPRINTS

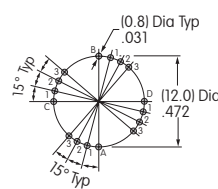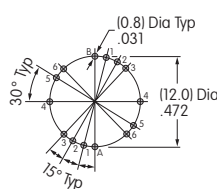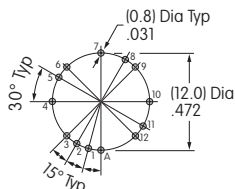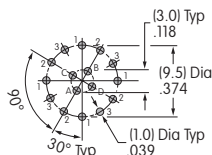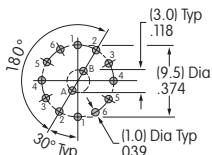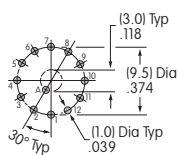| Single Pole MRAN112	Double Pole MRAN206	Four Pole MRAN403	Single Pole MRF112 MRK112	Double Pole MRF206 MRK206	Four Pole MRF403 MRK403

(3.0) Typ .118

(9.5) Dia .374

30° Typ

(1.0) Dia Typ .039

180°

(3.0) Typ .118

(9.5) Dia .374

30° Typ

(1.0) Dia Typ .039

90°

(3.0) Typ .118

(9.5) Dia .374

30° Typ

(1.0) Dia Typ .039

(0.8) Dia Typ .031

(12.0) Dia .472

30° Typ

15° Typ

(0.8) Dia Typ .031

(12.0) Dia .472

30° Typ

15° Typ

(0.8) Dia Typ .031

(12.0) Dia .472

15° Typ

NKK SWITCHES

Series MR

Toggles
Rockers
Pushbuttons
Illuminated PB
Programmable
Keylocks

G Rotaries

Slides
Tactiles
Tilt
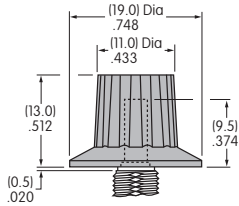Touch
Indicators
Accessories
Supplement

KNOBS

A AT433
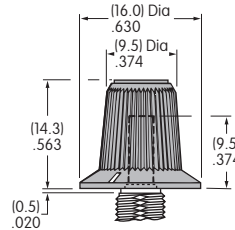Plain Black

Material:
Polyacetal

Color:
Black
only

B AT4103 Small
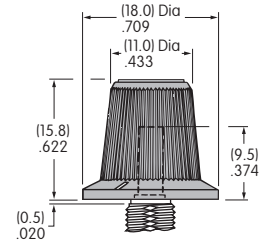Color Tipped

Base Material:
Polyester
Base Color:
Black

Polyamide Tip
Colors:
A, B, C, E, F, G, H

C AT4104 Large
Color Tipped

Base Material:
Polyester
Base Color:
Black

Polyamide Tip
Colors:
A, B, C, E, F, G, H

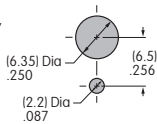Color Codes: **A** Black **B** White **C** Red **E** Yellow **F** Green **G** Blue **H** Gray
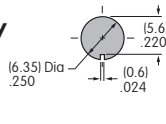
PANEL CUTOUTS & MAXIMUM EFFECTIVE PANEL THICKNESS
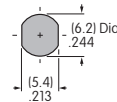
MRAN & MRK

Nonsealed Panel

Without Keyway

(6.35) Dia .250
(6.5) .256
(2.2) Dia .087

With Keyway

(6.35) Dia .250
(5.6) .220
(0.6) .024

MRK

Sealed Panel

(6.2) Dia .244
(5.4) .213

With Standard Hardware on Nonsealed Panel:
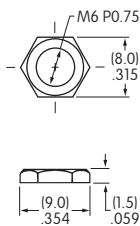MRAN .067" (1.7mm) MRK .087" (2.2mm)

Without Locking Ring on Nonsealed Panel:
MRAN .098" (2.5mm) MRK .118" (3.0mm)

With AT513M & AT535 only on Sealed Panel:
MRK .106" (2.7mm)
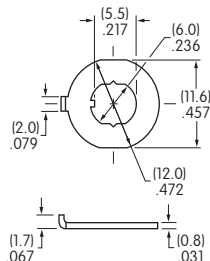
STANDARD MOUNTING HARDWARE

AT513M
Metric Hexagon Nut

Material:
Brass, nickel plating
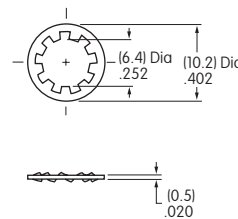1 for MRAN; 1 for MRK

M6 P0.75
(8.0) .315
(9.0) .354
(1.5) .059

AT545
Locking Ring

Material:
Steel, chromate over zinc plating
1 for MRAN; 1 for MRK

(5.5) .217
(6.0) .236
(11.6) .457
(2.0) .079
(12.0) .472
(1.7) .067
(0.8) .031

AT509
Lockwasher

Material:
Steel, chromate over zinc plating
1 for MRAN; 1 for MRK

(6.4) Dia .252
(10.2) Dia .402
(0.5) .020

AT535
Rubber Ring

Material:
Nitrile butadiene rubber
1 for MRK

(6.2) Dia .244
(9.4) Dia .370
(1.3) .051
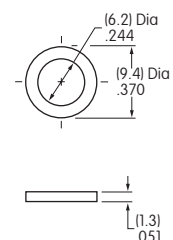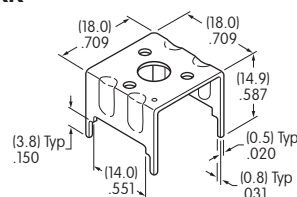
OPTIONAL SUPPORT BRACKET

AT543
Support Bracket for MRK

Material:
Steel with tin plating

(18.0) .709
(18.0) .709
(14.9) .587
(3.8) Typ .150
(14.0) .551
(0.5) Typ .020
(0.8) Typ .031

(17.5) .689
(17.2) .677
(1.2) Dia Typ .047
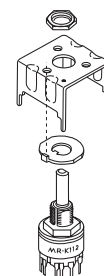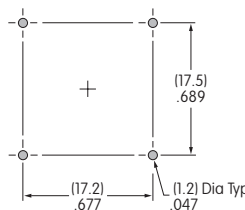
A support bracket
is needed when
the MRK is mounted
only to a PC board
and does not have
the bushing through
a panel.