



# Product Guide

To The Next  
Generation

**NIDEC COPAL ELECTRONICS CORP.**

# Switches

**S** : SMD type available

## Rotary coded switches

**S**



**S-4000**  
 ●Code: BCD  
 ●Contact rating:  
 Non-switching 100mA 50VDC  
 Switching 100mA 2.4VDC  
 ●Contact resistance 100mΩ max.  
 ●Dimensions: □4.8×2.6mm

**S**



**SA-7000**  
 ●Code: BCD, BCH  
 ●Contact rating:  
 Non-switching 100mA 50VDC  
 Switching 100mA 5VDC  
 ●Contact resistance 100mΩ max.  
 ●Dimensions: □7.2×3mm

**S**



**S-7000** **WASHABLE**  
 ●Code: BCD, BCH  
 ●Contact rating:  
 Non-switching 100mA 50VDC  
 Switching 100mA 5VDC  
 ●Contact resistance 100mΩ max.  
 ●Dimensions: □7.2×2.9mm

**S**



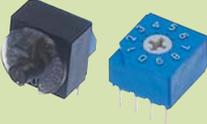
**SH-7000** **WASHABLE**  
 ●Code: BCD, BCH  
 ●Contact rating:  
 Non-switching 100mA 50VDC  
 Switching 100mA 5VDC  
 ●Contact resistance 100 mΩ max.  
 ●Dimensions: 7.3×7.1×3.7~3.75mm  
 ●Gray code output available

**S**



**DRS/DRR/SMR/SMRR** **WASHABLE**  
 ●Code: BCD, BCH  
 ●Contact rating:  
 Non-switching 100mA 50VDC  
 Switching 30 mA 15VDC  
 ●Dimensions: □7.5×4.1mm

**S**



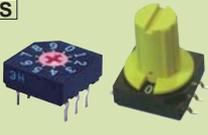
**S-1000A/2000A** **WASHABLE**  
 ●Code: BCD, BCH  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 5VDC  
 ●Dimensions: □10×7mm

**S**



**SC-1000/2000** **WASHABLE**  
 ●Code: BCD, BCH  
 ●Contact rating:  
 Non-switching 100 mA 50VDC,  
 Switching 100mA 5VDC  
 ●Terminal pin layout 4-1  
 ●Dimensions: □10×3.9mm

**S**



**SD-1000/2000**  
 ●Code: BCD, BCH  
 ●Contact rating:  
 Non-switching 100 mA 50VDC,  
 Switching 100mA 5VDC  
 ●Terminal pin layout 3-3  
 ●Heat resism knob type available (MTO)  
 ●Dimensions: □10×3.9mm

**S**



**SA-5000** **WASHABLE**  
 ●Code: BCD, BCH  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 5VDC  
 ●Integrated circuit: Pull-up  
 resistors, diodes  
 ●Dimensions: □11×9.5mm

**S**



**S-8000** **WASHABLE**  
 ●Code: BCO  
 ●SCSI compatible  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 5VDC  
 ●Dimensions: □7.2×3.9mm

**S**



**RD** **WASHABLE**  
 ●Code: Binary code  
 ●Contact rating:  
 Switching 1VA (1A 30VDC max.)  
 ●Dimensions: 17.8×12×17.8mm

## Dip slide switches

**S**



**CVS(1mm pitch)**  
 ●No. of bits: 1,2,3,4,8 bits  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 6VDC, 25mA 24VDC  
 ●Contact resistance: 200mΩ max.  
 ●Dimensions: 4.7×2~9×1.45mm

**S**



**CHS(Half pitch)** **WASHABLE**  
 ●No. of bits: 1, 2, 4, 6, 8, 10 bits  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 6VDC, 25mA 24VDC  
 ●Contact resistance: 50mΩmax.  
 ●Dimensions: 5.4×2.5~14.3×2.5mm

**S**



**CHP(Half pitch)**  
 ●No. of bits: 2, 4, 8 bits  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 6VDC, 25mA 24VDC  
 ●Contact resistance: 50mΩ max.  
 ●Dimensions: 5.9×4.6~12.2×4.6mm

**S**



**CFS(Full pitch)** **WASHABLE**  
 ●No. of bits: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 bits  
 ●Contact rating:  
 Non-switching DC50V 100mA,  
 Switching DC6V 100mA, DC24V 25mA  
 ●Contact resistance: 50mΩ max.  
 ●Dimensions: 6.4×3.95~9.9×4.5mm

**S**



**CFP(Full pitch)**  
 ●No. of bits: 2, 3, 4, 5, 6, 8, 10bits  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 6VDC, 25mA 24VDC  
 ●Contact resistance: 50mΩmax.  
 ●Dimensions: 8.6×7.5~22.8×6.7mm

**S**



**CYP(Full pitch, Low profile)** **WASHABLE**  
 ●No. of bits: 2, 4, 6, 8, 10 bits  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 6VDC, 25mA 24VDC  
 ●Contact resistance: 100mΩ max.  
 ●Dimensions: 6×6.48~26.8×5mm

**S**



**CES(Full pitch, Tall profile)**  
 ●No. of bits: 2, 4, 6, 8 bits  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 6VDC, 25mA 24VDC  
 ●Contact resistance: 50mΩmax.  
 ●Dimensions: 10×7.66~22.9×10mm

## Slide switches

**S**



**CJS** **WASHABLE**  
 ●Ideal for replacing jumper pins  
 ●Circuit structure: SPDT  
 (with neutral detent type available)  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 6VDC, 25mA 24VDC  
 ●Contact resistance: 70mΩ max.  
 ●Dimensions: 2.5×5.4~6×2.5mm

**S**



**CAS** **WASHABLE**  
 ●Ideal for replacing jumper pins  
 ●Circuit structure: SPDT  
 SPDT/2PDT/Dual SPDT  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 6VDC, 25mA 24VDC  
 ●Contact resistance: 50mΩ max.  
 ●Dimensions: 2.5~3.9×5.4×2.5mm

**S**



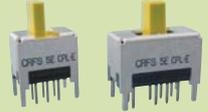
**CL-SA**  
 ●Ideal for replacing jumper pins  
 ●Continuous mountable with 2.54 mm pitch  
 ●Circuit structure: SPDT  
 ●Contact rating:  
 Non-switching 500mA 50VDC,  
 Switching 500mA 12VDC  
 ●Contact resistance: 22mΩ max.  
 ●Mounting Type PC, PC-R/A  
 ●Dimensions: 2.54×10×4.5mm

**S**



**CL-SB**  
 ●Wide variety 48 types, silver/gold contact  
 ●Circuit structure:  
 SPDT/SP3T/2PDT/2P3T  
 ●Contact rating: Non-switching  
 200mA 50VDC, Switching 200mA 12VDC  
 ●Contact resistance:  
 Silver 50mΩ max.Gold 70mΩ max.  
 ●Dimensions: 3.5×8.5~12×3.5mm

**S**



**CRFS**  
 ●High frequency: DC ~1.0GHz  
 ●Circuit structure: 2PDT/2P3T  
 ●Contact rating:  
 Non-switching 100mA DC50V,  
 Switching 100mA 12VDC  
 ●Contact resistance: 70mΩ max.  
 ●Dimensions: 6~6.5×10~13.8×8.5mm

**S**



**CMS**  
 ●Circuit structure:  
 2PDT/2P3T/2P4T/4PDT  
 ●Contact rating:  
 Non-switching 100mA 50VDC,  
 Switching 100mA 12VDC  
 ●Contact resistance: 70mΩ max.  
 ●Dimensions: 5×10.8~17.8×3.5~4.7mm

**S**



**CUS**  
 ●Circuit structure:  
 SPDT/SP3T/2PDT/SP4T  
 ●Contact rating:  
 Non-switching 100mA DC50V  
 Switching 300mA 4VDC  
 ●Contact resistance 70mΩ max.  
 ●Low-profile of 1.4mm  
 ●Dimensions:2.6~4.1×6.7~11.3×2mm

**S**



**CSS**  
 ●Circuit structure: SPDT/SP3T  
 ●Contact rating:  
 Non-switching 100mA 50VDC  
 Switching 100mA 12VDC  
 ●Contact resistance 70mΩ max.  
 ●Low-profile of 2.0mm  
 ●Self-return type available  
 ●Dimensions:3.8×8.5~12.5×2mm

**S**



**MHS**  
 ●Circuit structure:  
 SPDT/SP3T/2PDT/2P3T/4P2T  
 ●Contact rating: 200mA 12VDC  
 ●Switching function  
 On-On-On/On-On  
 ●Low-profile of 3.5mm  
 ●Dimensions:3.5×8.6~14×3.5mm

**S**



**MFS**  
 ●Circuit structure:  
 SPDT/SP3T/2PDT/2P3T/4P4T  
 ●Contact resistance:20~50mΩmax.  
 ●Switching function  
 On-On-On/On-On  
 ●Shorting/Non-shortng  
 ●Wide variety

## Slide switches



### MCS

- Circuit structure: SPDT/SP3T/2PDT/2P3T 4P2T/6P2T/4P3T/4P4T
- Switching function: On-On/On/On/On/On-Off/On/On-Off/On-Off
- Shorting/Non-shorting
- Wide variety



### MCS-N

- Circuit structure: 2PDT/4P2T
- Contact rating: Silver: Switching 0.2A 30VDC Gold: 0.4VA (50mA 30VDC max.)
- Contact resistance: Silver 30mΩ max. Gold 50mΩ max.
- Switching function: On-On
- Dimensions: 6.6×11.2~16.2×5mm



### ASE

**WASHABLE**

- High reliability by twin-contact clip
- Circuit structure: SPDT, 2PDT
- Contact rating: Switching 50mA 48VAC/DC
- Contact material: gold
- UL approved
- Dimensions: 5×9.5×8mm



### AS

- High reliability by twin-contact clip
- Circuit structure: SPDT, 2PDT
- Contact rating: Switching 50mA 48VAC/DC
- Contact material: gold
- Dimensions: 5×9.5×8mm



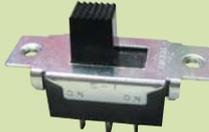
### BSS

- High reliable power supply switch
- Circuit structure: SPDT, 2PDT
- Contacts material: Silver/Gold(MTO)
- Contact rating: Switching 6A 125VAC 3A 250VAC, 4A 30VDC/ 25mA 20VDC
- For panel mounting or PCB
- UL approved
- Dimensions: 7.9~12.9×13×8.5mm



### HSS

- Circuit structure: SPST/SPDT/2PST/2PDT
- Contact rating: Switching 12A 125VAC, 6A 250VAC (1 pole) 8A 125VAC, 5A 250VAC (2 poles)
- For panel mounting
- Dimensions: 15×21×14mm



### S

- Circuit structure: 2PDT
- Contact rating: 8A 125VAC, 4A 250VAC
- Switching function: On-On
- UL approved
- Dimensions: 14×20×10mm



### SS

- Circuit structure: SPDT
- Contact rating: 8A 125VAC / 10A 125VAC / 6A 250VAC
- Switching function: Off-On/On-Off/On-Off-On
- Dimensions: 16×29×22mm



### ES

- Circuit structure: SPST/SPDT/2PDT
- Contact rating: 25A 125VAC / 25A/12A 250VAC, 15A 125VAC / 15A/7A 250VAC
- For panel mounting
- Dimensions: 16×28.8×15.8mm 19.3×33×19.9mm



### SS220K-23

- High inrush: 70A
- Circuit structure: 2PST
- Contact rating: 20A 250VAC
- For built-in use (ex. Electronic tools)
- Melting protection structure
- Dimensions: 14×27.5×19.8mm

## Rotary selector switches

**S**



### CS-32

**WASHABLE**

- Circuit structure: SP2T
- Contact rating: Non-switching 0.5VA Switching 100mA 16VDC
- Contact resistance: 2Ω max.
- Dimensions: 3.4×3.4×2mm

**S**



### CS-4

**WASHABLE**

- Circuit structure: SPDT/SP3T/2PDT/SP4T
- Contact rating: Non-switching 0.5VA Switching 100mA 16VDC
- Contact resistance: 100mΩ max.
- Dimensions: 5×4.5×2.3mm

**S**



### CS-7

**WASHABLE**

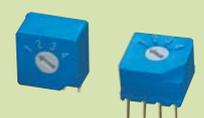
- Circuit structure: SP4T
- Contact rating: Non-switching 100mA 50VDC, Switching 100mA 5VDC
- Contact resistance: 100mΩ max.
- Dimensions: 7.3×7.1×3.75mm



### SS-10

**WASHABLE**

- Circuit structure: SP5T/SP6T/2P3T
- Contact rating: Non-switching 100mA 50VDC, Switching 100mA 5VDC
- Contact resistance: 100mΩ max.
- Dimensions: 10×10×7mm



### S-2050

**WASHABLE**

- Circuit structure: SP4T
- Contact rating: Non-switching 100mA 50VDC, Switching 100mA 5VDC
- Contact resistance: 100 mΩ max.
- Dimensions: 10×10×7mm



### RS/RG

**WASHABLE**

- Circuit structure: 1-3 poles 2-12 contacts, 4-6 poles 2-6 contacts
- Contact rating: 1VA (1A 30VDC max.)
- Contact resistance: 100mΩ max.
- Dimensions: 17.8×12×17.8mm (1block)



### MRE(36° step)

- Circuit structure: 1-10, 2-5, 3-3, 4-2
- Contact rating: 500mA 125VAC
- Panel seal
- Dimensions: φ 16×15.3mm



### MR(30°/36° step)

- Circuit structure: 1-10, 2-5, 3-3, 4-2 (36° step) 1-12, 2-6, 3-4, 4-3 (30° step)
- Contact rating: 500mA 125VAC
- Variable stopper available (36° step)
- Dimensions: φ 16×14.5mm



### MRB(45° step)

**WASHABLE**

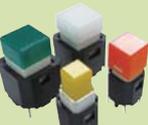
- Circuit structure: SP3T
- Contact Rating: Switching 0.4VA (12VDC max.)
- Twin contact type
- Gold contacts (for use in dry circuit)
- Dimensions: □ 15.8 × 11mm



### SRF

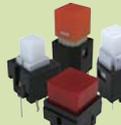
- Circuit structure: SPDT (90° step) SP3T/SP4T (45° step)
- Contact Rating: 6A 125VAC / 3A 250VAC (SPDT, SP3T) 1VA (50mA 48VDC max.) (LTM)
- Dimensions: φ 28×18.5~20mm

## Push-button switches (Illuminated type)



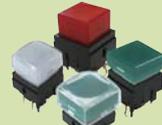
### CFPB

- Full surface illumination by LED
- Circuit structure: SPST
- Contact rating: 5mA 5VDC, 1mA 20VDC
- Soft operating feel
- Wide variety of key-top dimensions: □ 6mm/□ 9mm/□ 11mm/□ 12mm
- Dimensions: □ 9.9~14.8×12~14mm



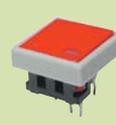
### 13AL/13BL

- Full surface illumination by LED
- Circuit structure: SPST
- Contact rating: 5mA 5VDC, 1mA 20VDC
- Wide variety of key-top dimensions: □ 6mm/□ 9mm/□ 11mm
- Dimensions: □ 9.9~15×12~14mm



### 15EL/15GL

- Full surface illumination by LED
- Circuit structure: SPST
- Contact rating: 5mA 5VDC, 1mA 20VDC
- Wide variety of key-top dimensions: □ 12mm/□ 14mm/□ 15mm/□ 18mm
- With concave face shape clear button-cover available (15GL)
- Dimensions: 15×14×12.5mm



### TM/TR

- Ultra-Miniature Switch with LED
- Metal contact / Rubber contact
- Circuit structure: SPST
- Contact rating: 10mA 12VDC(TM) 1VA (50mA 48VDC max.) (TM)
- Contact material: Silver/Gold (TM)
- Wide variety of button's color & style
- Dimensions: 5.9~10.5×7~11.5×6.5mm



### LTM/LTR

- Full surface illumination by LED
- Metal contact / Rubber contact
- Circuit structure: SPST
- Contact rating: 10mA 12VDC(LTR) 1VA (50mA 48VDC max.) (LTM)
- Contact material: Silver/Gold (LTM)
- Wide variety of button's color & style
- Dimensions: □ 8×6.5mm



### LTM3

- Connector wiring
- Snap-in panel mounting
- Sharp operating feel
- Circuit structure: SPST
- Contact rating: 1VA (50mA max 48VDC max.)
- Contact material: Silver/Gold
- Dimension: 12×11.5×13.5mm



### TP/TPL

- Circuit structure: 2PDT
- Contact rating: 0.1A 30VDC
- Contact material: Silver/Gold
- TPL: Lock type (stroke: 1mm) PL: Non-lock type (stroke: 1.5mm)
- Wide variety of button's color & style
- Dimensions: 8.5×7.5×6.5mm



### LP

- Full face illumination by LED
- Circuit structure: SPDT/2PDT
- Contact rating: 3A 125VAC / 3A 250VAC / 3A 30VDC, 0.4VAC/DC (Gold contacts)
- LED illuminated / LED indicator
- For panel Snap-in mounting or PCB
- UL, CSA approved (except indicator)
- Dimensions: 15.2~19×15.2×10mm



### DP1~3

- Circuit structure: SPST/4PST
- Contact rating: 50mA 24VDC
- Contact material: Silver/Gold
- Self-cleaning contact mechanism
- Light operating feel
- Wide variety of button's color & style
- Dimensions: 12.4~19×12.4~17.4×6.5~8.3mm



### DP4

- Non-illuminated type
- Circuit structure: 2PDT
- Contact rating: 100mA 5VDC
- Switching function: On-On/On-Mom
- Contact material: Silver/Gold
- Self-cleaning contact mechanism
- Dimensions: □ 12.6×10.2mm

## Push-button switches (Non-illuminated type)

**S**



**CFPA** **WASHABLE**

- Reflow solderable, Right angle
- Circuit structure: SPDT
- Contact rating: 0.4VA (28VDC max.)
- Contact material: Gold
- Switching function: On-Mom
- Dimensions: 7.5×8.5×5.3mm

**S**



**SMAP** **WASHABLE**

- Reflow solderable, Right angle
- Circuit structure: SPDT/2PDT
- Contact rating: 0.4VA (28VDC max.)
- Contact material: Gold
- Switching function: On-Mom
- Dimensions: 8.35×11.75×5mm

**S**



**FP** **WASHABLE**

- Circuit structure: SPDT/2PDT
- Contact rating: 0.4VA (28VDC max.)
- Switching function: On-Mom
- Gold plated contacts
- Terminal: Wavy
- Dimensions: 4.5×7.0×5.4 mm

**S**



**CFP2** **WASHABLE**

- Circuit structure: SPDT/2PDT
- Contact rating: 0.4VA (28VDC max.)
- Switching function: On-Mom
- Gold plated contacts
- Terminal: Straight
- Dimensions: 4.5×7.0×5.4 mm

**S**



**APE** **WASHABLE**

- Circuit structure: SPDT/2PDT
- Contact rating: 0.4VA (50mA 60VAC/DC max.)
- Switching function: On-Mom
- Gold plated contacts
- UL approved
- Dimensions: 5×9.5×8 mm

**S**



**AP**

- Circuit structure: SPDT/2PDT
- Contact rating: 0.4VA (50mA 60VAC/DC max.)
- Switching function: On-Mom
- Gold plated contacts
- Dimensions: 5×9.5×8mm

**S**



**CF-PD**

- Fixed panel by assembly resin nut
- Connector wiring
- Sharp click feeling
- Circuit structure: SPST
- Contact rating: 1 VA (50mA 48VDC max.)
- Switching function: On-Mom
- Dimensions:  $\phi$  20×16.8mm

**S**



**SP101**

- Sharp and light operating feel
- Snap-in panel mounting
- Circuit structure: SPST/SPDT
- Contact rating: 60mA 30VDC
- Contact material: Gold
- Connector wiring, PC terminal available
- Switching function: On-Mom
- Dimensions: 10.5×20×11mm

**S**



**SPC103**

- Sharp and light operating feel
- Wide variety of button colors
- Snap-in panel mounting
- Circuit structure: SPDT
- Contact rating: 3A AC125V/AC250V/DC30V
- Switching function: On-Mom
- Dimensions:  $\square$  18×14.8mm

**S**



**MSP**

- Circuit structure: SPST
- Contact rating: Silver contact: 3A 125VAC Gold contact: 25mA 20VDC
- Switching function: On-Mom/Off-Mom
- Small size ● For set/resetting
- Dimensions:  $\phi$  12×19 mm

**S**



**B series**

- Circuit structure: 1~4PDT
- Contact rating: 6A 125VAC / 3A 250VAC / 4A 30VDC
- Contact material: Silver / Gold (MTO)
- Switching function: On-On/On-Mom
- For panel mounting or PCB
- Dimensions: 13×8~22.6×11.7~19.8mm

- UL, CSA approved models available
- Self-extinguishing resin housing
- Wide variety of button styles
- Panel water proof type (8P) \*class IP67
- Light and soft operating feel by snap action construction (8R-n/8W-n)
- Snap-in panel mounting (8W-n)

**S**



**SP/SPP/S2P**

- Circuit structure: SPST/SPDT/2PST/2PDT
- Contact rating: AC125 V 3 A / AC250 V 1 A, AC125 V 10 A / AC250 V 6 A
- Switching function: On-(On)
- UL, CSA approved
- Wide variety of button selections

**S**



**Tactile switches (Non-illuminated type)**

**SMT1/TME1** **WASHABLE**

- Sharp tactile feel
- Circuit structure: SPST
- Contact rating: 1VA (DC48V 50mA max.)
- Contact material: Silver/Gold
- Switching function: On-Mom
- Anti-static electricity
- Dimensions: 6.5×7.5×3mm

**SMT3/SMT3E3** **WASHABLE** **[SMT3E3]**

- Sharp tactile feel
- Circuit structure: SPST
- Contact rating: 0.6VA (DC24V 30mA max.)
- Contact material: Silver/Gold
- Switching function: On-Mom
- Anti-static electricity (SMT3E3)
- Dimensions: 6.8×7×2.5mm

**S**



**CF-CA**

- Right angle tactile switches
- Circuit structure: SPST
- Contact rating: 1VA (50mA 32VDC max.)
- Contact material: Silver/Gold
- Switching function: On-Mom
- Wide variety of button length
- Dimensions: 3.8×6.7×7mm

**S**



**CL-DA**

- Used in A-TCA standard package
- Direction for operation: side
- Circuit structure: SPST
- Contact rating: 100mA 12VDC
- Contacts material: Gold
- Switching function: On-Mom/Off-Mom
- Dimensions: 4×5.7×2mm

**S**



**CL-DB**

- Used in  $\mu$ -TCA standard package
- Direction for operation: top or side
- Circuit structure: SPST
- Contact rating: 1mA 5VDC
- Contacts material: Gold
- Switching function: Off-Mom
- Dimensions: 2.8×3.5×1.95mm

**S**



**CF-DA**

- Long stroke: 7.5mm
- Connector wiring
- Snap-in panel mounting
- Circuit structure: SPST
- Contact rating: 100mA 30VDC
- Contacts material: Silver
- Switching function: Off-Mom
- Dimensions: 11×19×13mm

**S**



**SPB101**

- Long stroke: 5mm
- Connector wiring
- Snap-in panel mounting
- Circuit structure: SPST
- Contact rating: 50mA 48VDC
- Contacts material: Silver/Gold
- Switching function: On-Mom/Off-Mom
- Dimensions: 9×13.3×12.5mm

**S**



**FL** **WASHABLE**

- Ultra-compact type
- Circuit structure: SPDT/2PDT
- Contact rating: 0.4VA (DC28V max.)
- Contact material: gold
- PC, R.A. terminals
- Dimensions: 4.5×7×5.4mm

**S**



**CF-LD**

- Light operate feeling and clear visibility in lever design
- Ultra-compact type
- Circuit structure: SPDT
- Contact rating: 0.4VA (0.1A 28VAC/DC max.)
- 3 lever colors: White/Red/Gray
- Dimensions: 7×4.5×7 mm

**S**



**ALE** **WASHABLE**

- High reliability by twin-contact clip
- Circuit structure: SPDT/2PDT
- Contact rating: 0.4 VA (50mA 60VAC/DC max.)
- Contact material: gold
- PC and R.A. terminals
- UL approved
- Dimensions: 5×9.5×8mm

**S**



**CF-LA (Dust proof)**

- High inrush: 160A
- Circuit structure: SPST/2PST
- Contact rating: 16A 125VAC, 16A 250VAC
- Wide variety of terminal styles (5 kinds)
- Snap-in panel mounting
- C-US UL, UL(TV-6), ENEC approved
- Dimensions: 10.8×27.8×17.8mm

**S**



**SLE6 / SLE10 (Dust proof)**

- Circuit structure: SPST/SPDT
- Contact Rating: 6A 125VAC / 4A 250VAC(SLE6) 10A 125VAC / 5A 250VAC(SLE10)
- Snap-in panel mounting
- With rubber cover types available
- C-US UL, CSA, VDE, SEMKO approved
- Dimensions: 12.9×18.8×12.5mm

**S**



**SLE210K (Dust proof)**

- High inrush: 100A
- Circuit structure: 2PST
- Contact Rating: 10A 125VAC / 10A 250VAC
- Snap-in panel mounting
- C-US UL, VDE, SEMKO approved

**S**



**SL10K**

- High inrush: 100A
- Circuit structure: 2PST
- Contact Rating: 10A 125VAC / 6A 250VAC
- Snap-in panel mounting
- UL, CSA, VDE approved

**S**



**SLE10K**

- High inrush: 60A
- Panel water proof \*class IP64
- Circuit structure: 2PST
- Contact Rating: 10A 125VAC / 6A 250VAC
- Snap-in panel mounting
- UL, CSA, VDE approved

**S**



**SLA215K**

- Circuit structure: 2PST
- Contact Rating: 15A 125VAC / 15A 250VAC
- Enhanced isolation structure
- Snap-in panel mounting
- UL, CSA, ENEC approved
- Dimensions: 13×18.8×13mm

**S**



**ELE120 (Dust proof)**

- High inrush: 120A
- Circuit structure: SPST
- Contact rating: 20A 125VAC / 12A 250VAC
- C-US UL approved
- Dimensions: 16~19.5×28.8~33×16~24.6mm

## Lever rocker switches



### EL/ELE

- Circuit structure: 1~2P1~2T
- Contact Rating: 25/20/15/10A 125VAC, 25/15/12/7A 250VAC
- Self-extinguishing resin housing
- Screw panel mount
- Dust proof (ELE)
- Dimensions: 16~19.3×29~33×22~23.6mm



### HLA/HLC/HLS

- Circuit structure: SPST/2PST/3PST/SPDT/2PDT
- Contact Rating: 8A 125VAC, 5A 250VAC, 12A 125VAC, 6A 250VAC
- Self-extinguishing resin housing
- For panel snap-in mounting
- UL, CSA approved
- Dimensions: 15~25×21~28×9~21.5mm



### B series

- High reliable power supply switch
- Circuit structure: 1~4PDT
- Contact rating: 6A 125VAC, 3A 250VAC, 4A 30VDC / 25mA 20VDC
- Contacts material: silver/gold (MTO)
- Dimensions: 13×8~22.6×9~17.5mm

- UL, CSA approved models available
- Self-extinguishing resin housing
- Wide variety of actuator styles
- For panel mounting or PCB
- Dust proof type (8HD)
- Snap-in panel mounting type (8H/8HD)

## Panel seal rocker switches



### CL-LB

- Multifunction and utility switch
- Panel seal (IP68 compatible)
- Switching function: 8 types
- Rich lineup such as illuminated type

- Actuator designed for excellent operability from ergonomics standpoint
- Circuit structure: SPST/SPDT/2PST/2PDT
- Snap-in panel mounting

- Contact rating: 15A 24VDC, 20A 12VDC, 10A 250VAC / 15A 125VAC
- Dimensions: 24.5×48.4×27.4mm

- Applications: Function operation for construction machinery, automobile use, etc.

## Toggle switches



### FT

WASHABLE

- Ultra-compact type
- Circuit structure: SPDT/2PDT
- Contact rating: 0.4VA (28VDC max.)
- Contact material: Gold
- Terminal: Wavy
- Dimensions: 4.5×7×5.4mm



### CFT2

WASHABLE

- Ultra-compact type
- Circuit structure: SPDT/2PDT
- Contact rating: 0.4VA (28VDC max.)
- Contact material: Gold
- Terminal: Straight
- Dimensions: 4.5×7×5.4mm



### ATE

WASHABLE

- High reliability by twin-contact clip
- Circuit structure: SPDT/2PDT
- Contact rating: 0.4VA (50mA 60VAC/DC)
- Contact material: Gold
- Terminal pin pitch: 2.54mm
- UL approved (except with cap type)



### ATE4/ATLE4

WASHABLE

- High reliability by twin-contact clip
- Circuit structure: SPDT/2PDT
- Contact rating: 50mA 48VAC/DC
- Contact material: Gold
- Lever lock type
- UL approved (except with cap type)



### BT

- Circuit structure: SPDT/DPDT
- Contact rating: 50mA 20VAC/DC
- Contact material: Gold
- Insulation resistance 10000MΩ min.
- Dimensions: 7.6~12.7×15.8×8.5mm

## S



### CF-TA

- Through hall reflow toggle SW (R/A)
- Circuit structure: SPDT
- Contact rating: 50mA 48VAC/DC
- Contact material: gold
- Lever-lock type available
- Dimensions: 8×9.5×5mm



### B series

- High reliable power supply switch
- Circuit structure: 1~4PDT
- Contact rating: 6A 125VAC, 3A 250VAC, 4A 30VDC / 25mA 20VDC



- Contacts material: silver/gold (MTO)
- For panel mounting or PCB
- Dimensions: 13×7.9~22.6×9~11.3mm
- UL, CSA approved models available



- Self-extinguishing resin housing
- Wide variety of actuator styles
- Panel water proof type (8F) \*class IP67
- Lever-lock type (8E)



WASHABLE  
[8G, 8GA, 8GD, 8GS]

## ET



### ET

- Circuit structure: 1~4PST/1~4PDT/6PST/6PDT
- Contact Rating: Switching 3~30A 125VAC, 2~25A 250VAC
- UL, CSA approved models available
- Self-extinguishing resin housing
- For panel mounting
- Dimensions: 16~57×25.5~33.5×14.5~29.2mm

## Key switches



### MRK/MRKC

- Circuit structure: 1~2P 2~4T
- Contact rating: 0.4VA (20VDC max.)
- Click operation feeling
- MRKC: Cylinder key type
- Dimensions: 14.5×15.8×11.8mm / 15.8×11.8mm (MRKC)



### MRK1052B

- High security for the exclusive key
- Circuit structure: SP5T
- Contact rating: 100mA 35VDC
- Connector wiring
- Nut attachment on panel
- Dimensions: φ21.4×25mm

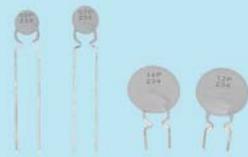
# Circuit protectors

## Resettable Fuses



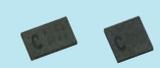
### PRCP series

- Polymer PTC Thermistors
- Quick rising edge at trip point
- UL, CSA, TÜV approved
- Max. rated voltage (V max.): 6.0~72V
- Hold current: 0.05~13A, Trip current: 0.1~24A
- Max. rated current (I max.): 10~100A
- Min. resistance value (R min.): 0.003~7.3Ω



### CR-CP series

- Ceramic PTC Thermistors
- Quick rising edge at trip point
- Operated more than 100,000 times repeatedly
- Max. rated voltage (V max.): 16V \*low operating voltage
- Hold current: 470~1550mA, Trip current: 880~2860mA
- Max. rated current (I max.): 2~10A
- Resistance: 0.15~1.0Ω \*low resistance



### C-FAP series

- Fast response (less than 1 μsec)
- Wide bandwidth (fc=3GHz)
- Small SMD package (DFN)
- Small energy consumption (100nJ)
- UL approved
- Max. trigger current (I trigger max.): 50/100/200/300/500mA
- Max. impulse voltage (V imp): 250/400/500/650/850V

# Trimmer potentiometers

**S** : SMD type  
**T** : Through hole pin type

**S**



**ST-2**

- Adjustment turns: 1 turn
- Sealed
- Resistance range: 100~1MΩ
- Resistance tolerance: ±20%
- Power rating: 0.1W (70°C), 0W (125°C)
- Dimensions: 2.4×1.7×2.8mm

**S**



**ST-32**

- Adjustment turns: 1 turn
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±20%
- Power rating: 0.125W (70°C), 0W (125°C)
- Dimensions: 3.4×2.0×3.4mm

**S**



**ST-4/ST-42**

- Adjustment turns: 1 turn
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±20%
- Power rating: 0.25W (70°C), 0W (125°C)
- Dimensions: 5.0×2.3×4.5mm

**S**



**ST-5**

- Adjustment turns: 14 turns
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±10%
- Power rating: 0.25W (85°C), 0W (120°C)
- Dimensions: 6.75×4.3×6.0mm

**S**



**ST-7**

- Adjustment turns: 3 turns
- Sealed
- Resistance range: 50~1MΩ
- Resistance tolerance: ±20%
- Power rating: 0.25W (70°C), 0W (125°C)
- Dimensions: 6.4×3.4×6.1mm

**S**



**SM-3/SM-31**

- Adjustment turns: 11 turns(SM-3) / 5 turns(SM-31)
- Sealed
- Resistance range: 50~2MΩ
- Resistance tolerance: ±20%
- Power rating: 0.125W (70°C), 0W (150°C)
- Dimensions: 3.2×3.9×3.9mm

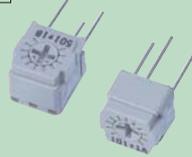
**S**



**SM-42/SM-43**

- Adjustment turns: 11 turns(SM-42) / 5 turns(SM-43)
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±10%
- Power rating: 0.25W (85°C), 0W (150°C)
- Dimensions: 3.9×5.3×4.8mm

**T**



**FT-63**

- Adjustment turns: 1 turn
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±10%
- Power rating: 0.5W (70°C), 0W (125°C)
- Dimensions: 7.0×5.8×7.0mm

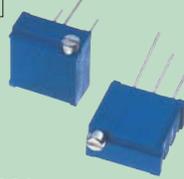
**T**



**CT-6**

- Adjustment turns: 1 turn
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±10%
- Power rating: 0.5W (70°C), 0W (120°C)
- Dimensions: 7.0×5.8×7.0mm

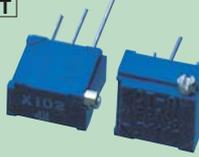
**T**



**CT-94**

- Adjustment turns: 18 turns
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±10%
- Power rating: 0.5W (70°C), 0W (125°C)
- Dimensions: 4.8×9.6×9.6mm

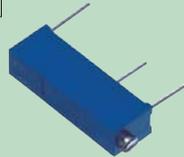
**T**



**CT-9**

- Adjustment turns: 18 turns
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±10%
- Power rating: 0.5W (70°C), 0W (125°C)
- Dimensions: 5.5×9.6×9.6mm

**T**



**CT-20**

- Adjustment turns: 15 turns
- Sealed
- Resistance range: 10~5MΩ
- Resistance tolerance: ±10%
- Power rating: 0.5W (70°C), 0W (120°C)
- Dimensions: 5.0×6.4×19mm

**T**



**TM-7**

- Adjustment turns: 3 turns
- Sealed
- Resistance range: 50~2MΩ
- Resistance tolerance: ±10%
- Power rating: 0.5W (70°C), 0W (120°C)
- Dimensions: φ7.2×6.9mm

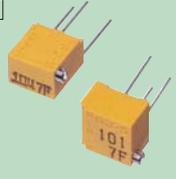
**T**



**RJ-4**

- Adjustment turns: 3 turns
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±10%
- Power rating: 0.5W (70°C), 0W (120°C)
- Dimensions: φ4.9×4.5mm

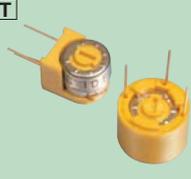
**T**



**RJ-5**

- Adjustment turns: 14 turns
- Sealed
- Resistance range: 10~2MΩ
- Resistance tolerance: ±10%
- Power rating: 0.25W (85°C), 0W (120°C)
- Dimensions: 4.3×6.75×6.0mm

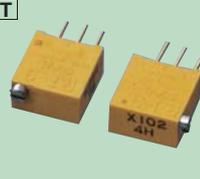
**T**



**RJ-6**

- Adjustment turns: 1 turn
- Sealed
- Resistance range: 10~5MΩ
- Resistance tolerance: ±10%
- Power rating: 0.5W (70°C), 0W (120°C)
- Dimensions: φ7.0×5.8mm

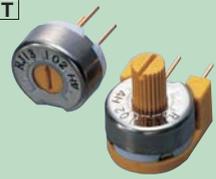
**T**



**RJ-9**

- Adjustment turns: 18 turns
- Sealed
- Resistance range: 10~5MΩ
- Resistance tolerance: ±10%
- Power rating: 0.5W (70°C), 0W (120°C)
- Dimensions: 4.7×9.7×9.0mm

**T**



**RJ-13**

- Adjustment turns: 1 turn
- Sealed
- Resistance range: 10~5MΩ
- Resistance tolerance: ±10%
- Power rating: 0.75W (70°C), 0W (120°C)
- Dimensions: φ12.4×6.3mm

# Attenuators, Mixed signal devices

**Attenuators**



**T2114/T2710**

- Step type variable attenuators
- For speech equipments of 600Ω
- Corresponds to the unbalanced circuit / balanced circuit (T2114 only)
- Attenuation: 0.5~8dB (15.5dB total), 1~16dB (31dB total)
- Impedance: 600Ω
- Rated Power: 50 mW
- Frequency: DC~150kHz

**Digital potentiometers**



**DP series**

- Digital controlable potentiometers
- Automatic adjustment possible by automatic adjustment
- Non-volatile wiper storage
- Low power CMOS technology
- Number of taps: 16/32/64/100/128/256
- Package: SOT-23/MSOP/SOIC/TSSOP/TDFN

**White LED drivers**



**W series**

- Driver ICs for activating white LEDs
- Small size and low-profile package
- Available types: 1. Simple LED activation
- 2. Individual activation of 4 separate LEDs
- 3. Activation of grouped 6 LEDs
- Applications: Lighting for automotive instrument panel, Camera flash, LCD/Keypad backlighting for hand-held electronics devices
- Package: SOIC/SOT-23/MSOP/TDFN/DFN

# Current sensors

## Current Sensors



**C-CT**

- AC0.1~200A, 4 types lineup
- Output linearity outstanding
- Compact, so easy installation in distributing box
- Clamp-on type, so also supports the existing box



**C-DCZCT**

- Small DC current's measurements: DC1~200mA
- High accuracy: ±1%FS ±20mV
- Least influence of magnetization: Less than DC1mA in current level
- Convenient Single Supply (+5V)

# Pressure sensors

## Pressure transducers (module only)



**P-2000**  
 ● 0~9.81, ~98.1 kPa, Gauge  
 ● Media: non-corrosive gases  
 ● Output: 90±40mV  
 ● Power: 1.5mADC  
 ● Dimensions: 12×11×12.5mm



**P-3000S**  
 ● 0~4.9, ~9.81, ~49, ~98.1, ~490, ~686kPa, Gauge, ±49, ±98.1kPa, Differential, 0~34.3, ~98.1kPa, Absolute  
 ● Media: non-corrosive gases  
 ● Output: 100±30mV  
 ● Power: 1.5mADC  
 ● Dimensions: □15×21.5mm □17×30.5mm



**P-7100**  
 ● 0~100 kPa, ~100~100 kPa, 0~1 MPa, 0~133.3 kPa abs  
 ● Media: gases and liquids  
 ● Output: 0.5~4.5 V (ratio metric)  
 ● Power: ±0.5 VDC  
 ● Dimensions: R type φ 17×27.7 mm  
 M5 type φ 17×18.7 mm



**P-8300**  
 ● 0~49, ~98.1, ~343, ~981 kPa Gauge, 0~34.3, ~98.1 kPa, Absolute  
 ● Media: gases and liquids  
 ● Output: 100±50mV  
 ● Power: 1.5mADC  
 ● Dimensions: φ 23.5×23.2/10.8mm



**P-8305**  
 ● 0~10 kPa, Gauge  
 ● Media: gases and liquids  
 ● Output: 25±10 mV  
 ● Power: 1.5 mA DC  
 ● Dimensions: φ 29.8×7.7 (mm)



**P-8505**  
 ● 0~50, ~100, ~350, 1000kpa, Gauge  
 ● Media: gases and liquids  
 ● Output: 90±10mV  
 ● Power: 1.5mADC  
 ● Dimensions: φ 20×15.3mm



**PA-20**  
 ● 0~100kPa, Gauge, ~100~300kPa, Compound  
 ● Media: non-corrosive gases  
 ● Output: 1~5VDC  
 ● Power: 12~24VDC  
 ● Dimensions: 10×25.5×20.5mm



**PA-100**  
 ● 0~1, ~2, ~5kPa, Gauge, ±1, ±2, ±5kPa, Differential  
 ● Media: non-corrosive gases  
 ● (\*for low differential pressure)  
 ● Output: 0.5~4.5V  
 ● Power: 5VDC  
 ● Dimensions: 22.5×25×18.1mm



**PA-204**  
 ● 0~5, ~10, ~50, ~100kPa, Gauge  
 ● Media: Non-corrosive gases  
 ● Output: 0.5~4.5V (ratio metric output)  
 ● Power: 5V±0.5V  
 ● Dimensions: 19×19×15mm



**PA-500**  
 ● 0~49, ~98.1, ~343, ~490, ~981 kPa, ~9.81kPa, Gauge  
 ● Media: gases and liquids  
 ● Output: 1~5V  
 ● Power: 12~24VDC  
 ● Dimensions: φ 28×49.7mm



**PA-708**  
 ● ~100~100, ~300, ~600kPa, Compound  
 ● Media: gases and liquids  
 ● For ultra high purity aggressive fluids (\*PFA pressure port)  
 ● Output: 1~5V ● Power: 12~24VDC  
 ● Dimensions: φ 45×98mm



**PA-750/758**  
 ● 0~100, ~350kPa, ~1, ~3.5MPa, ~100kPa, Gauge, ~100~100, ~300kPa, Compound, 0~100kPa, Absolute  
 ● Media: Gases and liquids  
 ● Output: 1~5V/4~20mA  
 ● Power: 10.8~30VDC, 24VDC  
 ● Dimensions: φ 23.5×61.6/63.5mm



**PA-8008**  
 ● 0~98.1, ~343, ~981, ~98.1kPa, Gauge  
 ● Media: gases and liquids  
 ● Output: 1~5V  
 ● Power: 12~24VDC  
 ● Dimensions: φ 28×50.2mm



**PA-838-D**  
 ● 0~10, ~50, ~100kPa, Differential  
 ● Media: gases and liquids  
 ● Output: 4~20mA  
 ● Power: 12VDC  
 ● Dimensions: 40×70×79.5mm



**PA-830/838**  
 ● 0~49, ~98.1, ~981kPa, Gauge (PA-838), 0~9.81, ~49, ~98.1, ~343, ~981, ~98.1kPa, Gauge, 0~34.3~98.1, Absolute (PA-830)  
 ● Media: gases and liquids  
 ● Output: 1~5V/4~20mA  
 ● Power: 12~24VDC/24VDC  
 ● Dimensions: φ 30×55~59mm



**PA-840/848**  
 ● 0~0.1~0.1, ~0.35 MPa, 0~1.0, ~3.5 MPa, Gauge, 0.1 MPa, Absolute  
 ● Output: 1~5 VDC / 4~20 mA  
 ● Power: 10.8~26.4 / 21.6~26.4 VDC  
 ● High weather resistance thanks to hard connection head  
 ● Comply with IP67



**PA-850/858**  
 ● 0~100, ~350, ~1000, ~100kPa, Gauge, ~100~300kPa, Compound, 0~100kPa, Absolute  
 ● Media: gases and liquids  
 ● Output: 1~5V with 1 switch/4~20mA  
 ● Power: 12~24VDC/24VDC  
 ● Dimensions: φ 35.2×48~49mm



**PA-860/868**  
 ● 0~5, ~10, ~20, ~35 MPa, Gauge  
 ● Media: hydraulic oil  
 ● Output: 1~5V/4~20mA  
 ● Power: 12~24VDC  
 ● Dimensions: φ 30×41mm



**PA-870/878**  
 ● 0~2, ~3.5, ~5MPa, Gauge  
 ● Media: gases and liquids  
 ● Output: 1~5V/4~20mA  
 ● Power: 12~24VDC  
 ● Dimensions: φ 30×47.5mm



**PA-920/928**  
 ● 0~0.5, 0~1, ~0.1~0.5, ~0.1~1MPa  
 ● Media: gases and liquids  
 ● Output: 1~5 VDC / 4~20 mA  
 ● Power: 12~24 VDC  
 ● Fitting: 1.125"W-Seal, 1.125"C-Seal, VC male/female(9/16-18UNF), UJR, TVC(9/16-18UNF)



**PA-930 High-temperature type**  
 ● ~100~100 kPa, 0~1000 KPa, Gauge  
 ● Media: gases and liquids  
 ● Output: 1~5 VDC  
 ● Power: 12~24 VDC  
 ● Dimensions: φ 30×91.5 mm



**PA-930-A High-temperature type**  
 ● 0~200 kPa Absolute  
 ● Media: gases and liquids  
 ● Output: 1~5 VDC  
 ● Power: 12~24 VDC  
 ● Dimensions: φ 30×101.5 mm



**PA-960/968**  
 ● 0~5, ~10, ~20, ~35, ~50 MPa, Gauge  
 ● Media: gases and liquids compatible with 17-4PH (SUS630)  
 ● Output: 1~5 VDC / 4~20 mA  
 ● Power: 10.8~30 VDC (including ripple)  
 ● Comply with IP67 (when mounting connector)

## Pressure switches



**PS20**  
 ● 0~100kPa, Gauge, ~100~300kPa, Compound  
 ● Media: non-corrosive gases  
 ● 1 switch output  
 ● Power: 12~24VDC  
 ● Dimensions: 10×25.5×20.5mm



**PS6**  
 ● 0~100, ~1000, ~100kPa, Gauge  
 ● Media: non-corrosive gases  
 ● 2 digits LED  
 ● Output: 1~5V with 1 switch, or 2 switch outputs  
 ● Power: 12~24VDC  
 ● Dimensions: 10×52.5×25mm



**PS40**  
 ● 0~100, ~1000kPa, Gauge  
 ● Media: non-corrosive gases  
 ● Output: 1~5V with 1 or 2 switch outputs  
 ● Power: 10.8~30VDC  
 ● Dimensions: 24.8×45×15mm



**PS30**  
 ● 100~100, ~1000kPa, Compound  
 ● Media: non-corrosive gases  
 ● 2.5 digits LED  
 ● Output: 2 switch outputs  
 ● Power: 12~24VDC  
 ● Dimensions: □30×29mm



**PS60**  
 ● ~100~100, ~3000, ~1000kPa, Compound  
 ● Media: non-corrosive gases  
 ● 3 digits LED  
 ● Output: 2 switch outputs  
 ● Power: 12~24VDC  
 ● Dimensions: 10×52.5×25mm

## Pressure switches



**PS8**  
 ● 0~98.1, ~343, ~981, ~98.1kPa, Gauge  
 ● Media: gases and liquids  
 ● Output: 2 switch outputs  
 ● Power: 12~24VDC  
 ● Dimensions: φ 28×50.2mm



**PS83**  
 ● 0~9.81, ~49, ~98.1, ~343, ~981kPa, ~98.1, Gauge, 0~34.3, ~98.1, absolute  
 ● Media: gases and liquids  
 ● Output: 2 switch outputs  
 ● Power: 12~24VDC  
 ● Dimensions: φ 30×55~59mm



**PS85**  
 ● ~100~100, ~300, ~1000kPa, Compound  
 ● Media: gases and liquids  
 ● Output: 2 switch outputs  
 ● Power: 12~24VDC  
 ● Dimensions: φ 35.2×48~49mm



**PS86**  
 ● 0~5, ~10, ~20, ~35MPa, Gauge  
 ● Media: hydraulic oil  
 ● Output: 2 switch outputs  
 ● Power: 12~24VDC  
 ● Dimensions: φ 30×41mm



**PS87**  
 ● 0~3.5, ~5MPa, Gauge  
 ● Media: gases and liquids  
 ● 1 switch output  
 ● Power: 12~24VDC  
 ● Dimensions: φ 30×26mm

## Handheld digital manometers



**PS91**  
 ● ~100~100kPa, Compound  
 ● Media: gases and liquids  
 ● 2 switch outputs  
 ● Power: 12~24VDC  
 ● Dimensions: φ 40×57.5mm



**PG-100N**  
 ● ~10~10, ~100~100, ~1000kPa, Compound  
 ● Media: non-corrosive gases  
 ● 3.5 digits LCD  
 ● Power: 2 AAA dry batteries  
 ● Dimensions: 55×110×16.9mm



**PG-100B**  
 ● ~100~100, ~1000kPa, Compound  
 ● 0~100kPa, Absolute  
 ● Media: Gases and liquids  
 ● 3.5 digits LCD  
 ● Power: 2 AAA dry batteries  
 ● Dimensions: 55×100×16.9mm



**PG-100**  
 ● 0~10, ~100, ~1000kPa, ~100, Gauge  
 ● ~10~10, ~100, ~1000kPa, Compound  
 ● 0~100kPa, Absolute  
 ● Media: non-corrosive gases  
 ● 3.5 digits LCD  
 ● Power: 3.6VDC (Lithium battery)  
 ● Dimensions: 60×90×20mm

## Pressure gauges



**PG-20**  
 ● 0~0.5, ~1MPa, Gauge, ~0.1~0.5MPa, ~1MPa Compound  
 ● Media: gases and liquids  
 ● 3.5 digits LED  
 ● Output: 1~5V/4~20mA with 1 switch output or 2 switch outputs  
 ● Power: 24VDC/12~24VDC  
 ● Dimensions: □38×135mm/□28×127mm



**PG-30**  
 ● ~10~10, ~100~100, ~1000kPa, Compound  
 ● Media: non-corrosive gases  
 ● 3 digits LED  
 ● Output: 1~5V with 2 switch outputs  
 ● Power: 10.8~30VDC  
 ● Dimensions: □30×35.5mm



**PG-35**  
 ● ~100~100, ~1000kPa, Compound, 0~100kPa, Absolute  
 ● Media: gases and liquids  
 ● 3 digits LED  
 ● Output: 1~5V with 2 switch outputs  
 ● Power: 10.8~30VDC  
 ● Dimensions: □30×37mm



**PG-35H**  
 ● 0~1, ~10, ~35MPa, Compound  
 ● Media: gases and liquids  
 ● 3 digits LED  
 ● Output: 1~5V with 2 switch outputs  
 ● Power: 10.8~30VDC  
 ● Dimensions: □30×37mm



**PG-35L**  
 ● ~100~100, ~1000kPa, Compound  
 ● Media: gases and liquids  
 ● 3 digits LED  
 ● Output: 1~5V with 2 switch outputs  
 ● Power: 10.8~30VDC  
 ● Dimensions: □30×37mm



**PG-75**  
 ● 0~0.1, ~1, ~3.5MPa, Gauge, ~0.1~0.1, ~1, ~3.5MPa, Compound  
 ● Media: gases and liquids  
 ● 3.5 digits LED  
 ● Output: 1~5V/4~20mA with 2 switch outputs  
 ● Power: 10.8~30VDC  
 ● Dimensions: 30×37×72mm



**PG-200**  
 ● 0~100, ~1000kPa, Gauge  
 ● 0~100kPa, Absolute  
 ● Media: non-corrosive gases  
 ● 3.5 digits LCD  
 ● Output: 0~1V with 1 or 2 switch outputs  
 ● Power: 3.6VDC (Lithium battery) / 5~24VDC (External power)  
 ● Dimensions: □72×40mm



**PG-208**  
 ● 0~100, ~1000kPa, Gauge  
 ● Media: gases and liquids  
 ● 3.5 digits LCD  
 ● Output: 0~1V with 1 or 2 switch outputs  
 ● Power: 3.6VDC (Lithium battery) / 3~24VDC (External power)  
 ● Dimensions: □72×40mm

## Pressure indicators



**PZ-30**  
 ● Input signal: 1~5V/4~20mA  
 ● 3 digits LED  
 ● Output: 1~5V/4~20mA with 2 switch outputs  
 ● Power: 10.8~30VDC  
 ● Dimensions: □31×35mm



**PZ-200**  
 ● Input signal: 1~5V/4~20mA  
 ● 3.5 digits LCD  
 ● Output: 4~20mA with 4 switch outputs  
 ● Power: 12~24VDC  
 ● Dimensions: □72×40mm

## Liquid leak sensors



**WL10**  
 ● Infrared reflectance method  
 ● Media: Water  
 ● Power: 12~24VDC  
 ● Dimensions: φ 25×10.6mm

# Potentiometers

- W** : Wirewound type
- P** : Conductive plastic type
- C** : Cermet type
- O** : Optical contactless type

## For manual setting

**W**



**M-1303/1305**  
 ● Adjustment turns: 3 turns/5 turns  
 ● Effective electrical angle: 1080°/1800°  
 ● Linearity: ±0.5%  
 ● Resistance range: 100~20kΩ  
 ● Rotational life: 15000 cycles  
 ● Dimensions: φ 13×16.1mm

**W**



**M-22S10/M-22E10**  
 ● Adjustment turns: 10 turns  
 ● Effective electrical angle: 3600°  
 ● Linearity: ±0.2%  
 ● Resistance range: 100~100kΩ / 1~20kΩ  
 ● Rotational life: 25000 cycles  
 ● Dimensions: φ 22×18.5mm / φ 22×19mm

**C**



**JP-30B**  
 ● Adjustment turns: Single  
 ● Effective electrical angle: 300°  
 ● Resistance range: 500 Ω~100 kΩ  
 ● Linearity: ±0.5%  
 ● Rotational life: 100 thousand cycles  
 ● Dimensions: φ 30×14.5 mm

## For sensor

**O**



**JT22**  
 ● Effective electrical angle: 120°, 360°  
 ● Linearity: ±3.0%  
 ● Output voltage: 0.5~+4.5V  
 ● Rotational life: 100 million cycles  
 ● Dimensions: φ 22×15mm

**O**



**JT30**  
 ● Effective electrical angle: 120°, 360°  
 ● Linearity: ±3.0%  
 ● Output voltage: 0.5~+4.5V  
 ● Rotational life: 100 million cycles  
 ● Dimensions: φ 22×15mm

**W**



**J40S/J45S/J50S**  
 ● Adjustment turns: 1 turn  
 ● Effective electrical angle: 353°  
 ● Linearity: ±0.1~0.15%  
 ● Resistance range: 500~50kΩ  
 ● Rotational life: 1~10 million cycles  
 ● Dimensions: φ 44.5×16.6mm

**W**



**M22L10**  
 ● Adjustment turns: 10 turns  
 ● Effective electrical angle: 3600°  
 ● Linearity: ±0.2%  
 ● Resistance range: 1k~20kΩ  
 ● Rotational life: 5 million cycles  
 ● Dimensions: φ 22×18.5mm

**P**



**MC1003**  
 ● Adjustment turns: 3 turns  
 ● Effective electrical angle: 1080°  
 ● Linearity: ±1%  
 ● Resistance range: 5k~20kΩ  
 ● Rotational life: 1 million cycles  
 ● Dimensions: φ 10×12.6mm

## For sensor

**P**



**JC10**

- Adjustment turns: 1 turn
- Effective electrical angle: 324°
- Linearity: ±2%
- Resistance range: 2k, 5k, 10kΩ
- Rotational life: 5 million cycles
- Dimensions: φ 10×7.6mm

**P**



**JC22E**

- Adjustment turns: 1 turn
- Effective electrical angle: 320°
- Linearity: ±1%
- Resistance range: 1k~10kΩ
- Rotational life: 10 million cycles
- Dimensions: φ 22×12mm

**P**



**JC22S**

- Adjustment turns: 1 turn
- Effective electrical angle: 340°
- Linearity: ±0.5%
- Resistance range: 200~10kΩ
- Rotational life: 20 million cycles
- Dimensions: φ 22.5×23.8mm

**P**



**JC30S/JC40S**

- Adjustment turns: 1 turn
- Effective electrical angle: 343°/345°
- Linearity: ±0.5% / ±0.3%
- Resistance range: 500~20kΩ
- Rotational life: 30 million cycles
- Dimensions: φ 30×17mm/φ 40×20mm

**P**



**CRV16**

- Adjustment turns: 1 turn
- Effective electrical angle: 220°+5°
- Linearity: ±1%
- Resistance range: 1k, 2k, 5k, 10kΩ
- Rotational life: 0.5 million cycles
- Dimensions: φ 16.2×6.7mm

**P**



**JCL**

- Effective electrical travel: 10~50mm
- Linearity: ±0.5%
- Resistance range: 1k~10kΩ
- Mechanical life: 20 million cycles
- Dimensions: 45~85×18×14mm

**P**



**JCL B**

- Effective electrical travel: 100~500mm
- Linearity: ±0.5%
- Resistance range: 1k~10kΩ
- Mechanical life: 4~20 million cycles
- Dimensions: 159~569×22×24mm

**C**



**JP-30**

- Adjustment turns: Single
- Effective electrical angle: 300°
- Resistance range: 500~100 kΩ
- Linearity: ±0.5%
- Rotational life: 3 million revolution
- Dimensions: φ 30×14.5 mm

# Joystick encoders

**JOYSTICK**  
4 or 8 directions

**ENCODER**  
20 pos. (5P/R)

**SWITCH**  
Push-on



**CJ25**

- Multi-function device...Joystick, encoder, and push switch in one package
- Joystick available in 4 or 8 directions
- 20 positions (5 P/R)
- Long life ... Joystick 500 K cycles, encoder & switch 1 M cycles
- Square wave, A and B phases
- Dimensions: φ 25.4×16.4 mm

# Rotary encoders

**O** : Optical contactless type  
**M** : Magnetic contactless type  
**C** : Contact type

**O**



**REC16K/L/M(K.L. With Click)**

- Smooth operational feel, long life
- Input voltage 5VDC
- Square wave, A and B phases
- Resolution: 25 P/R
- Single shaft/Double shaft
- With push switch / without push switch
- Dimensions: □ 16×10.5 mm

**O**



**REC16D/REC16F**

- Input voltage: 5VDC
- Square wave, A and B phases
- Resolution: 25 P/R
- With switch Single shaft / Double shaft
- Dimensions: □ 16×10 mm

**O**



**REC16/RES16**

- Input voltage: 5VDC
- Square wave, A and B phases
- With push switch (except RES16) / without push switch
- With click / Without click
- Resolutions: 20, 50 P/R
- Dimensions: □ 16×10mm

**O**



**REC20**

- Input voltage: 5VDC
- Square wave, A and B phases
- With click
- Resolutions: 25 P/R
- Dimensions: φ 20×18mm

**O**



**RES20B**

- Input voltage: 5VDC
- Square wave, A and B phases
- Without click
- Resolution: 25 P/R
- Dimensions: φ 20×18mm

**O**



**REC20D/RES20D**

- Input voltage: 5VDC
- Square wave, A and B phases
- With click/Without click
- Resolution: 25, 50 P/R
- Dimensions: φ 20×11mm

**O**



**RECW20D/RESW20D**

- Input voltage: 5VDC
- Square wave, A and B phases
- With click/Without click
- Resolutions: 25, 50 P/R
- Dimensions: φ 20×11mm
- Panel seal type

**M**



**RMS20(Magnetic)**

- Magnetic encoders
- Input voltage: 5VDC
- Square wave, A and B phases
- Without click
- Resolution: 100, 250, 256 P/R
- Dimensions: φ 20×13.5mm

**C**



**MRP**

- Input voltage: 10mA 5VDC
- Square wave
- Resolution: 20 P/R
- Dimensions: □ 10×7.5 mm

**For sensor**

**O**



**RE12**

- Ultra-small size
- Input voltage: 5VDC
- Quasi-sinusoidal wave, A phase
- Resolution: 100~300 P/R
- Dimensions: φ 12×12mm

**O**



**RE12D**

- Ultra-small size
- Input voltage: 5VDC
- Square wave, A and B phases
- Resolution: 100~300 P/R
- Dimensions: φ 12×15.5mm

**O**



**RE20F**

- Input voltage: 5VDC
- Quasi-sinusoidal wave, A phase or A and B phases
- Resolution: 100, 300 P/R
- Dimensions: φ 20×13.4mm

**O**



**RE30E**

- Input voltage: 5~12, 24VDC
- Square wave, A, B and Z phases
- Resolutions: 100~1024 P/R
- Dimensions: φ 30×30mm

# Motors

## DC geared motors



- LC30G**
- Rated voltage: 24 VDC
  - Rated torque: 9.81 mN·m
  - Rated speed: 5400 min<sup>-1</sup>
  - No load speed: 7000 min<sup>-1</sup>
  - Gear ratio: 1/10~1/1500



- LC37G**
- Rated voltage: 24 VDC
  - Rated torque: 4.9 mN·m
  - Rated speed: 5200 min<sup>-1</sup>
  - No load speed: 7400 min<sup>-1</sup>
  - Gear ratio: 1/10~1/1500



- HG37**
- Rated voltage: 12, 24 VDC
  - Rated torque: 29~588 mN·m
  - Rated speed: 460~14.5 min<sup>-1</sup>
  - No load speed: 570~16.3 min<sup>-1</sup>
  - Gear ratio: 1/10~1/300



- HG16**
- Rated voltage: 6, 12 VDC
  - Rated torque: 24.5~49 mN·m
  - Rated speed: 310~55 min<sup>-1</sup>
  - No load speed: 390~60 min<sup>-1</sup>
  - Gear ratio: 1/30~1/240



- MG16B**
- Metal injection molding adopt
  - Rated voltage: 6, 12 VDC
  - Rated torque: 20~160 mN·m
  - Rated speed: 380~34 min<sup>-1</sup>
  - No load speed: 477~45 min<sup>-1</sup>
  - Gear ratio: 1/30~1/300



- LA16G324B**
- Rated voltage: 12 VDC
  - Rated torque: 14.7, 24.5 mN·m
  - Rated speed: 150 min<sup>-1</sup>, 65 min<sup>-1</sup>
  - No load speed: 190 min<sup>-1</sup>, 78 min<sup>-1</sup>
  - Gear ratio: 1/50, 1/120



- LC20G**
- Rated voltage: 12 VDC
  - Rated torque: 0.98 mN·m
  - Rated speed: 6000 min<sup>-1</sup>
  - No load speed: 7100 min<sup>-1</sup>
  - Gear ratio: 1/10~1/1500



- LC22G-103/105**
- Rated voltage: 12, 24 VDC
  - Rated torque: 1.96 mN·m
  - Rated speed: 4900 min<sup>-1</sup>/5100 min<sup>-1</sup>
  - No load speed: 6100 min<sup>-1</sup>
  - Gear ratio: 1/30~1/240



- LC22G-107/108**
- Rated voltage: 12, 24 VDC
  - Rated torque: 1.96 mN·m
  - Rated speed: 7000 min<sup>-1</sup>/7300 min<sup>-1</sup>
  - No load speed: 8100 min<sup>-1</sup>/7300 min<sup>-1</sup>
  - Gear ratio: 1/30~1/240

## Flat servomotors



- MS40**
- Low profile:  $\phi 40 \times 7.5$  mm
  - Long life (Blushless)
  - High speed, High torque
  - High precision control: 0.17°
  - Customized motor and driver solutions



- MS22**
- Compact design:  $\phi 22 \times 7.5$  mm
  - Long life (Blushless)
  - High speed, High torque
  - Customized motor and driver solutions



- SPG20-1000**
- Rotational motion ●10 poles
  - Number of phases: 4 phases
  - Excitation: 2 phases unipolar
  - Step angle: 18° (Motor only)
  - Gear ratio: 1/6~1/36
  - Dimensions:  $\phi 20 \times 20$  mm



- SPG27-1000**
- Rotational motion ●12 poles
  - Number of phases: 4 phases
  - Excitation: 2 phases unipolar
  - Step angle: 15° (Motor only)
  - Gear ratio: 1/2.5~1/12
  - Dimensions:  $\phi 27 \times 28.7$  mm

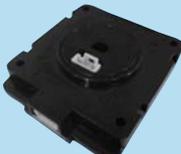


- SPS20/SPS10**
- Linear motion ●10 poles
  - Number of phases: 4 phases / 2 phases
  - Excitation: 2 phases unipolar / 2 phases bipolar
  - Step size: 25  $\mu$ m / 20  $\mu$ m
  - Dimensions:  $\phi 20 \times 18.5 / \phi 10 \times 10.1$  mm

## Solenoid



- PLA002**
- Compact
  - Easy connection with connector terminal
  - Winding resistance: 35  $\Omega \pm 10\%$
  - Rated voltage: 12 VDC
  - Pull-force: 0.35 mN·m Min.
  - Dimensions: 20×16×25.5 mm



- PLR40-1000**
- Easy connection with connector terminal
  - Number of poles: 6
  - Contact resistance/1pole: 2  $\Omega$  Max.
  - Allowable current/1pole: 1 A Max.
  - Rotational torque: 9.8 mN·m Max.
  - Rotational speed: 300 r/min Max.



- PLR32-2000**
- Easy connection with connector terminal (Input side)
  - Number of poles: 7
  - Contact resistance/1pole: 300 m $\Omega$  Max.
  - Allowable current/1pole: 1 A Max.
  - Rotational torque: 9.8 mN·m Max.
  - Rotational speed: 100 r/min Max.

# Micro blowers

## Micro blowers (Aerodynamic bearings)

## Compact, Light weight, So powerful, Less vibration, Long life



- TF037C-2100**
- With mounting bracket
  - Rated voltage: 24 VDC  $\pm 10\%$
  - Rated power supply current: 1.2 A Max.
  - Rotation speed (Max./ Rated): 45,000 r/min / 40,000 r/min
  - Pressure (Max./ Rated): 4.5 kPa / 4 kPa
  - Rated air flow: 100 l/min
  - Acoustic audible noise: 67.0 dB(A) Max.
  - Rated power consumption: 29 W Max.
  - Weight: Approx. 94 g
  - Material: Resin in full compliance with UL94 V0
  - Driver set also available



- TF037F-2000**
- Rated voltage: 12~24 VDC
  - Rated power supply current: 0.67 A Max.
  - Rotation speed (Max./ Rated): 45,000 r/min / 31,000 r/min
  - Pressure (Max./ Rated): 4.5 kPa / 2 kPa
  - Rated air flow: 100 l/min
  - Acoustic audible noise: 65.0 dB(A) Max.
  - Rated power consumption: 16.1 W Max.
  - Weight: Approx. 72 g
  - Material: Resin in full compliance with FDA standards
  - Driver set also available



- TF029B-1000**
- Rated voltage: 12~27 VDC
  - Rated power supply current: 0.62 A Max.
  - Rotation speed (Max./ Rated): 50,000 r/min / 36,000 r/min
  - Pressure (Max./ Rated): 3.5 kPa / 2 kPa
  - Rated air flow: 100 l/min
  - Acoustic audible noise: 65.0 dB(A) Max.
  - Rated power consumption: 14.9 W Max.
  - Weight: Approx. 55 g
  - Material: Resin in full compliance with FDA standards
  - Driver set also available



- TF037C-2000**
- Rated voltage: 24 VDC  $\pm 10\%$
  - Rated power supply current: 1.2 A Max.
  - Rotation speed (Max./ Rated): 45,000 r/min / 40,000 r/min
  - Pressure (Max./ Rated): 4.5 kPa / 4 kPa
  - Rated air flow: 100 l/min
  - Acoustic audible noise: 67.0 dB(A) Max.
  - Rated power consumption: 29 W Max.
  - Weight: Approx. 90 g
  - Material: Resin in full compliance with UL94 V0



- TF037E-2000**
- With mounting bracket
  - Rated voltage: 24 VDC  $\pm 10\%$
  - Rated power supply current: 0.86 A Max.
  - Rotation speed (Max./ Rated): 45,000 r/min / 35,500 r/min
  - Pressure (Max./ Rated): 4.5 kPa / 3 kPa
  - Rated air flow: 100 l/min
  - Acoustic audible noise: 65.0 dB(A) Max.
  - Rated power consumption: 22.7 W Max.
  - Weight: Approx. 165 g
  - Material: Resin in full compliance with UL94 V0

\*The above specs are based on rated voltage 24 VDC  $\pm 10\%$ .

# Brushless DC Fans

## DC fans



- F16EA**
- Air flow: 0.012 m<sup>3</sup>/min
  - Static pressure: 4.7 Pa
  - Noise: 3 dB(A)
  - Rated voltage: 3.3 VDC
  - Dimensions: □16×4 mm



- F17HA**
- Air flow: 0.015 m<sup>3</sup>/min
  - Static pressure: 10 Pa
  - Noise: 7 dB(A)
  - Rated voltage: 5 VDC
  - Dimensions: □17×8 mm



- F17FA**
- Air flow: 0.01 m<sup>3</sup>/min
  - Static pressure: 6 Pa
  - Noise: 5 dB(A)
  - Rated voltage: 3.3 VDC
  - Dimensions: □17×5 mm



- F251R**
- Air flow: 0.04, 0.05, 0.06 m<sup>3</sup>/min
  - Static pressure: 20, 30, 47 Pa
  - Noise: 11, 15, 20 dB(A)
  - Rated voltage: 5, 12 VDC
  - Dimensions: □25×10 mm



- F310R**
- Air flow: 0.06, 0.09 m<sup>3</sup>/min
  - Static pressure: 14, 23 Pa
  - Noise: 13, 17 dB(A)
  - Rated voltage: 5, 12 VDC
  - Dimensions: □30×10 mm



- F412R**
- Air flow: 0.11, 0.15 m<sup>3</sup>/min
  - Static pressure: 15, 26 Pa
  - Noise: 16, 23 dB(A)
  - Rated voltage: 5, 12, 24 VDC
  - Dimensions: □41×12.2 mm



- F410T**
- Air flow: 0.11, 0.15 m<sup>3</sup>/min
  - Static pressure: 10, 23 Pa
  - Noise: 12, 18 dB(A)
  - Rated voltage: 5, 12 VDC
  - Dimensions: □40×10 mm



- F614T**
- Air flow: 0.36, 0.43 m<sup>3</sup>/min
  - Static pressure: 20, 29 Pa
  - Noise: 23, 29 dB(A)
  - Rated voltage: 5, 12, 24 VDC
  - Dimensions: □62×14.5 mm



- F455B (Side flow type)**
- Air flow: 0.28 m<sup>3</sup>/min
  - Static pressure: 44 Pa
  - Noise: 20 dB(A)
  - Rated voltage: 5 VDC
  - Dimensions: □45×5 mm

## Polygon laser scanners (Custom products)

## High accuracy type (Ball bearings)



- PD30LA**
- Mirror size: φ40 mm
  - Dynamic pyramidal angle error accuracy 120/60 sec.
  - Speed range 1500~2000 r/min.
  - For digital PPCs, digital photo labs



- PD40LA**
- Mirror size: φ40 mm
  - Dynamic pyramidal angle error accuracy 60/30 sec.
  - Speed range 1600~2800 r/min.
  - For digital PPCs, digital photo labs



- PD40ERB**
- Mirror size: φ40 mm
  - Dynamic pyramidal angle error accuracy 90/60 sec.
  - Speed range 3000~8000 r/min.
  - For barcode readers



- PD60EA**
- Mirror size: φ55 mm
  - Dynamic pyramidal angle error accuracy 60/30 sec.
  - Speed range 1500~5000 r/min.
  - For digital PPCs, digital photo labs



- PD60ER**
- Mirror size: φ72 mm
  - Dynamic pyramidal angle error accuracy 60/30 sec.
  - Speed range 5000~12000 r/min.
  - For digital PPCs, digital photo labs



- PD60LA**
- Mirror size: φ65 mm
  - Dynamic pyramidal angle error accuracy 20/10 sec.
  - Speed range 2500~5000 r/min.
  - For medical equipment



- PD60SRB**
- Mirror size: φ84 mm
  - Dynamic pyramidal angle error accuracy 60/30 sec.
  - Speed range 15000 r/min.
  - For imagers

## High rotation speed type (Aerodynamic bearings)



- PT22ERG**
- Mirror size: φ26 mm
  - Dynamic pyramidal angle error accuracy 90/60 sec.
  - Speed range 20000~50000 r/min.
  - For laser printer



- PTC30ERG**
- Mirror size: φ40 mm
  - Dynamic pyramidal angle error accuracy 90/60 sec.
  - Speed range 20000~50000 r/min.
  - For Laser printers, medical equipment

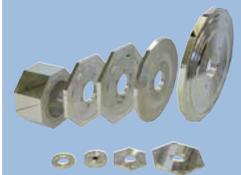


- PT60SRG**
- Mirror size: φ65 mm
  - Dynamic pyramidal angle error accuracy 80/40 sec.
  - Speed range 20000~40000 r/min.
  - For digital PPCs, digital photo labs



- PV60SRG**
- Mirror size: φ50~70 mA (t=3 to 5mm)
  - Dynamic pyramidal angle error accuracy 30 sec. (peak to peak)
  - Speed range 55000~70000 r/min.
  - For Semiconductor Inspection, Non-Destructive Inspection, etc

## Mirrors



- Various polygon mirrors & monogon mirrors



**NIDEC COPAL ELECTRONICS' advanced and unique technologies are bearing fruit in various industries.**

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