# Compact Rotary Actuator Rack \& Pinion Style Series CRQ2 

How to Order


Applicable Auto Switches/Refer to pages 761 to 809 for further information on auto switches.

| $\stackrel{\otimes}{\stackrel{\circ}{2}}$ | Special function | Electrical entry |  | Wiring (Output) | Load voltage |  |  | Auto switch model |  | Lead wire length (m) |  |  |  | Pre-wired connector | Applicable load |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | DC |  | AC | Perpendicular | In-line | $\begin{array}{\|c\|} \hline 0.5 \\ \text { (Nil) } \\ \hline \end{array}$ | $\begin{array}{\|c\|} \hline 1 \\ (\mathrm{M}) \end{array}$ | $\begin{array}{\|c} \hline 3 \\ (\mathrm{~L}) \\ \hline \end{array}$ | $\begin{gathered} 5 \\ (\mathrm{Z}) \end{gathered}$ |  |  |  |
|  |  | Grommet | Yes | 3-wire (NPN) | 24 V | 5V,12V | - | M9NV | M9N | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | IC circuit | Relay, PLC |
|  |  |  |  | 3-wire (PNP) |  |  |  | M9PV | M9P | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |  |  |
|  |  |  |  | 2-wire |  | 12 V |  | M9BV | M9B | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | - |  |
|  | Diagnostic indication (2-color) |  |  | 3-wire (NPN) |  | 5V, 12 V |  | M9NWV | M9NW | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | IC circuit |  |
|  |  |  |  | 3-wire (PNP) |  |  |  | M9PWV | M9PW | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |  |  |
|  |  |  |  | 2-wire |  | 12V |  | M9BWV | M9BW | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | - |  |
|  | Water resistant (2-color) |  |  | 3-wire (NPN) |  | $5 \mathrm{~V}, 12 \mathrm{~V}$ |  | M9NAV** | M9NA** | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | IC circuit |  |
|  |  |  |  | 3-wire (PNP) |  |  |  | M9PAV** | M9PA** | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |  |  |
|  |  |  |  | 2-wire |  | 12V |  | M9BAV** | M9BA** | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | - |  |
| C |  | Grommet | Yes | 3-wire (NPN equiv.) | - | 5 V | - | A96V | A96 | - | - | - | - | - | IC circuit | - |
| \% |  |  | - | 2-wire | 24V | 12V | 100V | A93V | A93 | $\bigcirc$ | - | $\bigcirc$ | - | - | - | Relay, PLC |
| $\stackrel{\text { ¢ }}{\text { ¢ }}$ |  |  | No |  |  |  | 100 V or less | A90V | A90 | $\bigcirc$ | - | $\bigcirc$ | - | - | IC circuit |  |

** Although it is possible to mount water resistant type auto switches, note that the rotary actuator itself is not of water resistant construction.

* Lead wire length symbols: 0.5 m ...... Nil (Example) M9NW
* Auto switches marked with "O" are made to order specification.
$1 \mathrm{~m} \ldots . . . \mathrm{M}$ (Example) M9NWM
$3 \mathrm{~m} \ldots . . \mathrm{L}$ (Example) M9NWL
$5 \mathrm{~m} \ldots . . \mathrm{Z}$ (Example) M9NWZ
* Auto switches are shipped together, (but not assembled).

[^0]Specifications


## JIS Symbol



Made to order
Refer to pages 256 to 270 for details.

| Symbol | Specifications/Content | Applicable shaft type |
| :---: | :---: | :---: |
| - | Shaft type variation | X, Y, Z, T, J, K |
| XA1 to XA24 | Shaft pattern sequencing I | S, W |
| XA31 to XA59 | Shaft pattern sequencing II | X, Y, Z, T, J, K |
| XC7 | Reversed shaft | S, W, X, T, J |
| XC8 to XC11 | Change of rotating range | $\begin{aligned} & \mathrm{S}, \mathrm{~W}, \mathrm{Y} \\ & \mathrm{X}^{*}, \mathrm{Z}^{*}, \mathrm{~T}^{*}, \\ & \mathrm{~J}^{*}, \mathrm{~K}^{*} \end{aligned}$ |
| XC12 to XC15 | Change of angle adjustable range ( $\left(0^{\circ}\right.$ to $\left.100^{\circ}\right)$ |  |
| XC16, XC17 | Change of angle adjustable range ( $90^{\circ}$ to $190^{\circ}$ ) |  |
| XC18, XC19 | Change of rotating range |  |
| XC20, XC21 | Change of angle adjustable range ( $90^{\circ}$ to $190^{\circ}$ ) |  |
| XC22 | Without inner rubber bumper | $\begin{aligned} & \text { S, W, X, Y, Z, } \\ & \text { T, J, K } \end{aligned}$ |
| XC30 | Fluorine grease |  |
| XC69 | Fluororubber seal |  |
| X6 | Shaft and parallel key made of stainless steel |  |

[^1]| Size | 10 | 15 | 20 | 30 | 40 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Fluid | Air (Non-lube) |  |  |  |  |
| Max. operating pressure | 0.7 MPa |  | 1.0 MPa |  |  |
| Min. operating pressure | 0.15 MPa |  | 0.1 MPa |  |  |
| Ambient and fluid temperature | $0^{\circ}$ to $60^{\circ} \mathrm{C}$ (No freezing) |  |  |  |  |
| Cushion | Rubber bumper |  | Not attached, Air cushion |  |  |
| Angle adjustment range | Rotation end $\pm 5^{\circ}$ |  |  |  |  |
| Rotation | $90^{\circ}, 180^{\circ}, 360^{\circ}$ |  |  |  |  |
| Port size | M5 x 0.8 |  | Rc 1/8, G 1/8, NPT 1/8, NPTF 1/8 |  |  |
| Output (N•m)* | 0.3 | 0.75 | 1.8 | 3.1 | 5.3 |

## Allowable Kinetic Energy and Rotation Time Adjustment Range

| Size | Allowable kinetic energy |  |  |  | Stable operational <br> rotation time <br> adjustment range |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Allowable kinetic energy (J) |  |  | Cushion angle |  |
|  | Without cushion | Rubber bumper | With air cushion* |  | Rotation time $\left(\mathrm{s} / 90^{\circ}\right)$ |
| $\mathbf{1 0}$ | - | 0.00025 | - | - | 0.2 to 0.7 |
| $\mathbf{1 5}$ | - | 0.00039 | - | - | 0.2 to 0.7 |
| $\mathbf{2 0}$ | 0.025 | - | 0.12 | $40^{\circ}$ | 0.2 to 1 |
| $\mathbf{3 0}$ | 0.048 | - | 0.25 | $40^{\circ}$ | 0.2 to 1 |
| $\mathbf{4 0}$ | 0.081 | - | 0.4 | $40^{\circ}$ | 0.2 to 1 |

* Allowable kinetic energy for the bumper equipped type

Maximum absorbed energy under proper adjustment of the cushion needles.
If operated where the kinetic energy exceeds the allowable value, this may cause damage to the internal parts and result in product failure. Please pay special attention to the kinetic energy levels when designing, adjusting and during operation to avoid exceeding the allowable limit.

## Mass

| Size | Standard mass $^{*}$ |  |  |
| :---: | :---: | :---: | :---: |
|  | $90^{\circ}$ | $180^{\circ}$ | $360^{\circ}$ |
| $\mathbf{1 0}$ | 120 | 150 | 200 |
| $\mathbf{1 5}$ | 220 | 270 | 380 |
| $\mathbf{2 0}$ | 600 | 700 | 1000 |
| $\mathbf{3 0}$ | 900 | 1100 | 1510 |
| $\mathbf{4 0}$ | 1400 | 1600 | 2280 |

* Excluding the mass of auto switch.


## $\triangle$ Precautions

i Be sure to read before handling.
I Refer to front matters 38 and 39 for Safety Instructions and
pages 4 to 13 for Rotary Actuator and Auto Switch:

- Precautions.


## $\triangle$ Caution

(1) The angle adjusting screw (angle adjustment bolt) is set at random within the adjustable rotating range. Therefore, it must be readjusted to obtain the angle that suits your application.


[^0]:    Refer to pages 796 and 797 for the details of solid state auto switch with pre-wired connector.

[^1]:    * Among the symbols XC8 to XC21, only XC12 and XC16 are compatible with shaft types X, Z, T, J and K.

