

# Rodless cylinders, Series RTC-BV

R481608194

AVENTICS  
Series RTC  
Rodless  
cylinders

2024-04-22

## AVENTICS Series RTC Rodless cylinders

The AVENTICS Series RTC rodless cylinders offer optimized stroke length in a compact size. The unique oval piston shape and one-piece slide/piston unit are just two characteristic features of RTC Series rodless cylinders besides their many common equipment options. They are available in four variants: as a basic version, slide bearing, compact guide and heavy duty versions for large loads. With different key strengths, they cover a large range of movements and positions. This saves space and facilitates machine design. The range of applications extends from piston diameters of 16 mm up to 80 mm and stroke lengths up to 9900 mm. The cylinders feature extreme repeatability and cover a large speed range from 0.01 m/s to >20 m/s.



## Technical data

|  |                      |
|--|----------------------|
| Industry                               | Industrial           |
| Piston Ø                               | 50 mm                |
| Stroke                                 | 400 mm               |
| Ports                                  | G 1/4                |
| Functional principle                   | Double-acting        |
| Magnetic piston                        | with magnetic piston |
| Guide                                  | integrated guide     |
| Version rodless cylinder               | Basic Version        |
| Piston force                           | 1237 N               |
| Pressure for determining piston forces | 6,3 bar              |
| Cushioning length                      | 20 mm                |
| Cushioning energy                      | 15 J                 |
| Cushioning                             | Pneumatically        |
| Cushioning                             | adjustable           |
| Max. speed                             | 0.8 m/s              |
| Stroke max.                            | 9900 mm              |
| Min. working pressure                  | 2 bar                |
| Max. working pressure                  | 8 bar                |
| Min. ambient temperature               | -25 °C               |

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|                                    |                     |
|------------------------------------|---------------------|
| Max. ambient temperature           | 60 °C               |
| Medium                             | Compressed air      |
| Min. oil content of compressed air | 0 mg/m <sup>3</sup> |
| Max. oil content of compressed air | 1 mg/m <sup>3</sup> |
| Max. particle size                 | 5 µm                |
| Weight 0 mm stroke                 | 1.39 kg             |
| Weight +10 mm stroke               | 0.031 kg            |

## Material

|                         |                                 |
|-------------------------|---------------------------------|
| Material cylinder tube  | Aluminum                        |
| Surface cylinder tube   | anodized                        |
| Material front cover    | Aluminum                        |
| Surface cover           | anodized                        |
| Seal material           | Polyurethane                    |
| Material sealing strips | Polyurethane<br>Stainless Steel |
| Material guide rail     | Aluminum                        |
| Surface ball rail table | anodized                        |
| Part No.                | R481608194                      |

## Technical information

The pressure dew point must be at least 15 °C less than ambient and medium temperature and may not exceed 3 °C.

The delivered product is lubricated for lifetime.

Further dimensions, referring to more than just the long slide, can be found in the section on the basic version of the RTC-BV.

The pressure dew point must be at least 15 °C less than ambient and medium temperature and may not exceed 3 °C.

The oil content of compressed air must remain constant during the life cycle.

Use only the approved oils from AVENTICS. Further information can be found in the "Technical information" document (available in <https://www.emerson.com/en-us/support>).

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## Dimensions in mm



S = stroke

| Piston Ø | Part No.   | B   | BU  | CU | E     | EE    | FH    | FR  | FS  |
|----------|------------|-----|-----|----|-------|-------|-------|-----|-----|
| 50 mm    | R481608171 | 58  | 163 | 40 | 51.5  | G 1/8 | 62.1  | 60  | 120 |
| 50 mm    | R481608181 | 70  | 182 | 40 | 60.5  | G 1/4 | 71.1  | 60  | 120 |
| 50 mm    | R481608191 | 92  | 205 | 40 | 67.5  | G 1/4 | 78.3  | 60  | 140 |
| 50 mm    | R481608201 | 112 | 233 | 55 | 82.5  | G 3/8 | 93.3  | 100 | 180 |
| 50 mm    | R481608211 | 140 | 269 | 55 | 103.5 | G 3/8 | 114.2 | 100 | 180 |

| Piston Ø | GR | MC | PL   | PM  | PO   | PP   | RT 1) | RU 2) | SG |
|----------|----|----|------|-----|------|------|-------|-------|----|
| 50 mm    | 30 | 20 | 18.5 | 9.5 | 24.5 | 9.5  | M6    | M6    | 22 |
| 50 mm    | 30 | 17 | 18   | 10  | 31.5 | 11   | M6    | M6    | 22 |
| 50 mm    | 30 | 23 | 16   | 16  | 35.5 | 12.5 | M8    | M6    | 22 |
| 50 mm    | 40 | 25 | 14   | 14  | 45.5 | 14.5 | M8    | M8    | 30 |
| 50 mm    | 40 | 27 | 14   | 14  | 59.5 | 16.5 | M8    | M8    | 30 |

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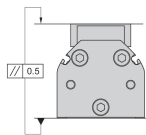
| Piston Ø | TG | W1  | W2    | W3 | W4 | W5 | W6 | W7   | Wd1 |
|----------|----|-----|-------|----|----|----|----|------|-----|
| 50 mm    | 40 | 93  | 72.5  | 16 | 26 | 30 | 19 | 26.8 | M8  |
| 50 mm    | 40 | 105 | 84.5  | 22 | 26 | 30 | 19 | 26.8 | M8  |
| 50 mm    | 40 | 140 | 114.5 | 11 | 70 | 40 | 22 | 32.7 | M12 |
| 50 mm    | 80 | 160 | 134.5 | 31 | 50 | 40 | 22 | 32.7 | M12 |
| 50 mm    | 80 | 188 | 162.5 | 45 | 50 | 40 | 22 | 32.7 | M12 |

| Piston Ø | Wd2 | WH    | ZD    | Moving mass kg |
|----------|-----|-------|-------|----------------|
| 50 mm    | M8  | 90    | 240   | 0.32           |
| 50 mm    | M8  | 101.5 | 263   | 0.49           |
| 50 mm    | M12 | 117.1 | 294.2 | 0.73           |
| 50 mm    | M12 | 116.5 | 333.2 | 1.31           |
| 50 mm    | M12 | 130.5 | 361   | 2.14           |

1) thread depth: 6 mm for piston Ø 16–25 mm, 10 mm for piston Ø 32–50 mm, 15 mm for piston Ø 63–80 mm

2) thread depth: 9 mm for piston Ø 16–40 mm, 12 mm for piston Ø 50–63 mm

## Permissible parallelism offset

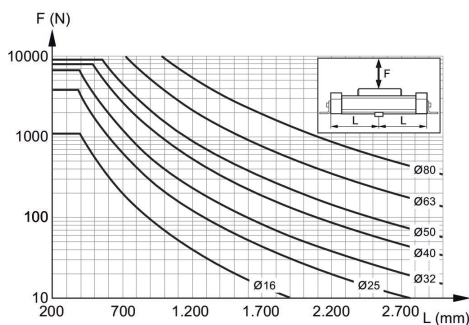


## Permissible forces Fx, Fy, Fz and torques Mx, My, Mz

$$\frac{M_x}{M_{x_{max.}}} + \frac{M_y}{M_{y_{max.}}} + \frac{M_z}{M_{z_{max.}}} \leq 1$$

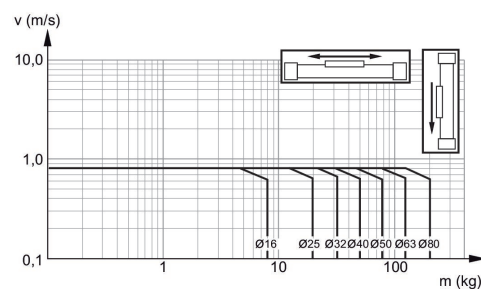
With simultaneously moments on the cylinder this equation must be used in addition to the maximum moments check. In the cushioning phase of the movement additional forces occur and must be considered. Please use our calculation tool for rodless cylinders on the <http://www.aventics.com>.

## Support span



Max. support span L [mm] as a function of F [N] at a deflection of 0.5 mm

## Limit diagram for pneumatic cushioning with horizontal mounting



$v_t$  = Piston velocity [m/s]  $m$  = Cushionable mass [kg]

The values for the cushionable mass  $m$  and piston velocity  $v$  must be on or below the graph for the selected piston diameter.

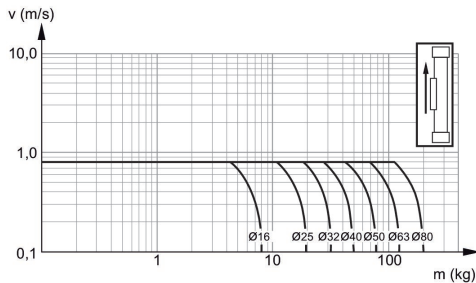
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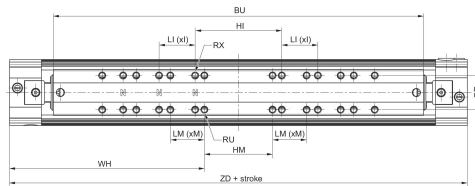
## Limit diagram for pneumatic cushioning with vertical mounting



$v_t$  = Piston velocity [m/s] m = Cushionable mass [kg]

The values for the cushionable mass m and piston velocity v must be on or below the graph for the selected piston diameter.

### For long slide



S = stroke

| Piston Ø | Part No.   | BU  | GR | HI    | LI    | (xI) | HM  | LM | (xM) |
|----------|------------|-----|----|-------|-------|------|-----|----|------|
| 50 mm    | R481608171 | 326 | 30 | 76.2  | 31.75 | 2    | 60  | 30 | 3    |
| 50 mm    | R481608181 | 364 | 30 | 76.2  | 31.75 | 3    | 60  | 30 | 4    |
| 50 mm    | R481608191 | 410 | 30 | 76.2  | 31.75 | 3    | 60  | 40 | 3    |
| 50 mm    | R481608201 | 466 | 40 | 152.4 | 38.1  | 2    | 100 | 40 | 3    |
| 50 mm    | R481608211 | 538 | 40 | 152.4 | 38.1  | 3    | 100 | 40 | 4    |

| Piston Ø | RU | RX          | WH    | ZD    |
|----------|----|-------------|-------|-------|
| 50 mm    | M6 | 1/4-20 UNC  | 171.5 | 403   |
| 50 mm    | M6 | 1/4-20 UNC  | 192.5 | 445   |
| 50 mm    | M6 | 1/4-20 UNC  | 219.6 | 499.2 |
| 50 mm    | M8 | 5/16-18 UNC | 233   | 566.2 |
| 50 mm    | M8 | 5/16-18 UNC | 265   | 630   |

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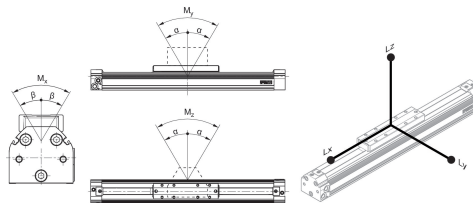
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## Weight [kg]

| Ø  | Weight 0 mm stroke | +10 mm stroke |
|----|--------------------|---------------|
| 32 | 2.31               | 0.031         |
| 40 | 3.5                | 0.044         |
| 50 | 5.57               | 0.065         |
| 63 | 9.4                | 0.098         |

Max. play and recommended max. lever arm length



L = lever arm

M = moment (Nm)

## For long slide

| Part No.   | Piston Ø | $\alpha$ | $\beta$    | Lx  | Ly  | Lz  |
|------------|----------|----------|------------|-----|-----|-----|
| R481608171 | 50 mm    | 0,3°     | 1,5° ±0,5° | 480 | 278 | 480 |
| R481608181 | 50 mm    | 0,2°     | 1,0° ±0,3° | 550 | 316 | 550 |
| R481608191 | 50 mm    | 0,2°     | 1,0° ±0,3° | 634 | 362 | 634 |
| R481608201 | 50 mm    | 0,15°    | 1,0° ±0,3° | 736 | 418 | 736 |

Max. play and recommended max. lever arm length

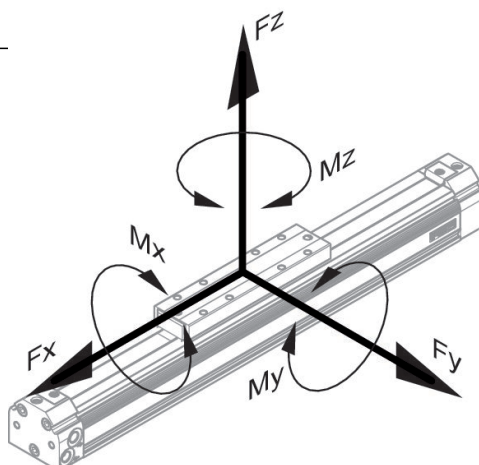
| Part No.   | Piston Ø | $\alpha$ | $\beta$    | Lx  | Ly  | Lz  |
|------------|----------|----------|------------|-----|-----|-----|
| R481608171 | 50 mm    | 0,6°     | 1,5° ±0,5° | 240 | 139 | 240 |
| R481608181 | 50 mm    | 0,4°     | 1,0° ±0,3° | 275 | 158 | 275 |
| R481608191 | 50 mm    | 0,4°     | 1,0° ±0,3° | 317 | 181 | 317 |
| R481608201 | 50 mm    | 0,3°     | 1,0° ±0,3° | 368 | 209 | 368 |

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## static, for long slide

| Part No.   | Piston Ø | Fx [N] | Fy [N] | Fz [N] | Mx [Nm] | My [Nm] | Mz [Nm] |
|------------|----------|--------|--------|--------|---------|---------|---------|
| R481608171 | 50 mm    | 2200   | 550    | 6600   | 36      | 160     | 86      |
| R481608181 | 50 mm    | 3500   | 650    | 8000   | 56      | 280     | 110     |
| R481608191 | 50 mm    | 5000   | 750    | 9000   | 70      | 460     | 140     |
| R481608201 | 50 mm    | 6800   | 850    | 13000  | 90      | 680     | 180     |

## dynamic, for long slide

| Part No.   | Piston Ø | Mx [Nm] | My [Nm] | Mz [Nm] |
|------------|----------|---------|---------|---------|
| R481608171 | 50 mm    | 4       | 84      | 24      |
| R481608181 | 50 mm    | 6       | 150     | 30      |
| R481608191 | 50 mm    | 9       | 256     | 40      |
| R481608201 | 50 mm    | 15      | 390     | 48      |

## static

| Part No.   | Piston Ø | Fx [N] | Fy [N] | Fz [N] | Mx [Nm] | My [Nm] | Mz [Nm] |
|------------|----------|--------|--------|--------|---------|---------|---------|
| R481608171 | 50 mm    | 2200   | 550    | 6600   | 18      | 80      | 43      |
| R481608181 | 50 mm    | 3500   | 650    | 8000   | 28      | 140     | 55      |
| R481608191 | 50 mm    | 5000   | 750    | 9000   | 35      | 230     | 70      |
| R481608201 | 50 mm    | 6800   | 850    | 13000  | 45      | 340     | 90      |

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## dynamic

| Part No.   | Piston Ø | Mx [Nm] | My [Nm] | Mz [Nm] |
|------------|----------|---------|---------|---------|
| R481608171 | 50 mm    | 4       | 42      | 12      |
| R481608181 | 50 mm    | 6       | 75      | 15      |
| R481608191 | 50 mm    | 9       | 128     | 20      |
| R481608201 | 50 mm    | 15      | 195     | 24      |