Equivalent Bore Size and Stroke

mm

Equivalent bore size	Standard strokes	Maximum available stroke
16	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	2000
20, 25	50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 1000	
32, 40, 50	100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200	

Remark: Non-standard strokes are available at 1mm pitch intervals. For strokes beyond the maximum available stroke, or for non-standard strokes, ask the nearest Koganei office. Consult us for delivery.

Mass

kg [lb.]

Model	Zero stroke mass	Additional mass for each 25mm [0.984in.] stroke	F-type support	M-type mount	Shock absorber unit			Additional mass of 1 sensor switch Note	
					Table	One side	Both sides	**ZE□□□A**	**ZE□□□B**
ORV16	0.20 [0.44]	0.03 [0.066]	0.008 [0.018]	0.019 [0.042]	0.077 [0.17]	0.062 [0.137]	0.124 [0.273]	0.015 [0.033]	0.035 [0.077]
ORV20	0.34 [0.75]	0.04 [0.088]	0.016 [0.035]	0.03 [0.066]	0.14 [0.31]	0.105 [0.232]	0.21 [0.46]		
ORV25	0.51 [1.12]	0.05 [0.110]	0.028 [0.062]	0.038 [0.084]	0.20 [0.44]	0.18 [0.40]	0.36 [0.79]		
ORV32	1.15 [2.54]	0.085 [0.187]	0.036 [0.079]	0.095 [0.209]	0.47 [1.04]	0.31 [0.68]	0.62 [1.37]		
ORV40	1.90 [4.19]	0.125 [0.276]	0.062 [0.137]	0.13 [0.287]	0.68 [1.50]	0.46 [1.01]	0.92 [2.03]		
ORV50	3.48 [7.67]	0.19 [0.419]	0.062 [0.137]	0.23 [0.507]	1.07 [2.36]	0.74 [1.63]	1.48 [3.26]		

Note: Sensor switch types A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Air Flow Rate and Air Consumption

While the slit type rodless cylinders **ORV** series' air flow rate and air consumption can be found through the following calculations, the quick reference table below provides the answers more conveniently.

Air flow rate: $Q_1 = \frac{\pi D^2}{4} \times L \times \frac{60}{t} \times \frac{P+0.101}{0.101} \times 10^{-6}$

Air consumption: $Q_2 = \frac{\pi D^2}{4} \times L \times 2 \times n \times \frac{P+0.101}{0.101} \times 10^{-6}$

Q_1 : Required air flow rate for cylinder	ℓ /min (ANR)
Q_2 : Air consumption of cylinder	ℓ /min (ANR)
D : Equivalent bore size	mm
L : Cylinder stroke	mm
t : Time required for cylinder to travel one stroke	s
n : Number of cylinder reciprocations per minute	times/min
P : Pressure	MPa

Air flow rate: $Q_1' = \frac{\pi D'^2}{4} \times L' \times \frac{60}{t} \times \frac{P'+14.7}{14.7} \times \frac{1}{1728}$

Air consumption: $Q_2' = \frac{\pi D'^2}{4} \times L' \times 2 \times n \times \frac{P'+14.7}{14.7} \times \frac{1}{1728}$

Q_1': Required air flow rate for cylinder	ft³/min. (ANR)※
Q_2': Air consumption of cylinder	ft³/min. (ANR)※
D′: Equivalent bore size	in.
L′: Cylinder stroke	in.
t : Time required for cylinder to travel one stroke	sec.
n : Number of cylinder reciprocations per minute	times/min
P′: Pressure	psi.

※Refer to p.54 for an explanation of ANR.

cm³ [in.³]/Reciprocation (ANR)

Equivalent bore size mm [in.]	Air pressure MPa [psi.]						
	0.2 [29]	0.3 [44]	0.4 [58]	0.5 [73]	0.6 [87]	0.7 [102]	0.8 [116]
16 [0.630]	1.198 [0.07311]	1.596 [0.09739]	1.993 [0.1216]	2.391 [0.1459]	2.789 [0.1702]	3.187 [0.1945]	3.585 [0.2188]
20 [0.787]	1.871 [0.1142]	2.493 [0.1521]	3.115 [0.1901]	3.737 [0.2280]	4.358 [0.2659]	4.980 [0.3039]	5.602 [0.3419]
25 [0.984]	2.924 [0.1784]	3.896 [0.2377]	4.867 [0.2970]	5.838 [0.3563]	6.810 [0.4156]	7.781 [0.4748]	8.753 [0.5341]
32 [1.260]	4.791 [0.2924]	6.382 [0.3895]	7.974 [0.4866]	9.566 [0.5838]	11.16 [0.6810]	12.75 [0.7781]	14.34 [0.8751]
40 [1.575]	7.486 [0.4568]	9.973 [0.6086]	12.46 [0.7604]	14.95 [0.9123]	17.43 [1.064]	19.92 [1.216]	22.41 [1.368]
50 [1.969]	11.70 [0.7140]	15.58 [0.9508]	19.47 [1.188]	23.35 [1.425]	27.24 [1.662]	31.13 [1.900]	35.01 [2.136]

The figures in the table show the air flow rate and air consumption when a rodless cylinder makes 1 reciprocation with stroke of 1mm [0.0394in.]. The air flow rate and air consumption actually required is found by the following calculations.

●Finding the air flow rate (for selecting F.R.L., valves, etc.)

Example: When operating a slit type rodless cylinder **ORV** series with an equivalent bore size of 40mm [1.575in.] at a speed of 300mm/s [118in./sec.] and under air pressure of 0.5MPa [73psi.]

$14.95 \times \frac{1}{2} \times 300 \times 10^{-3} = 2.24$ ℓ/s [0.0791ft³/sec.] (ANR)

(At this time, the flow rate per minute is $14.95 \times \frac{1}{2} \times 300 \times 60 \times 10^{-3} = 134.55$ ℓ/min [4.75ft³/min.] (ANR))

●Finding the air consumption

Example 1. When operating a slit type rodless cylinder **ORV** series with an equivalent bore size of 40mm [1.575in.] and a stroke of 100mm [3.94in.], and under air pressure of 0.5MPa [73psi.], for 1 reciprocation

$14.95 \times 100 \times 10^{-3} = 1.495$ ℓ [0.0528ft³]/Reciprocation (ANR)

Example 2. When operating a slit type rodless cylinder **ORV** series with an equivalent bore size of 40mm [1.575in.] and a stroke of 100mm [3.94in.], and under air pressure of 0.5MPa [73psi.], for 10 reciprocations per minute

$14.95 \times 100 \times 10 \times 10^{-3} = 14.95$ ℓ/min [0.528ft³/min.] (ANR)

Note: To find the actual air consumption required when using the slit type rodless cylinders **ORV** series, add the air consumption of the piping to the air consumption obtained from the above calculation.