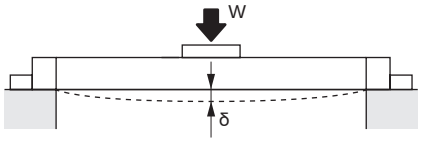
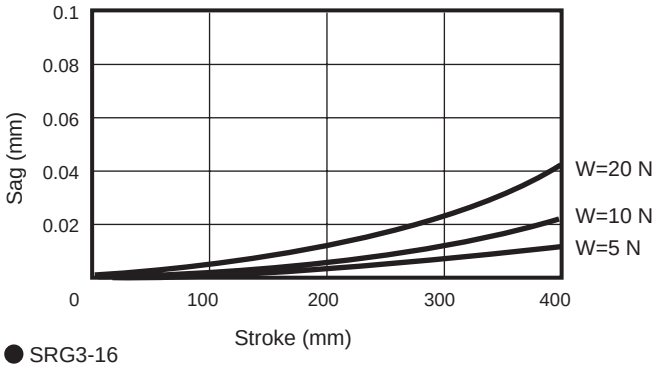
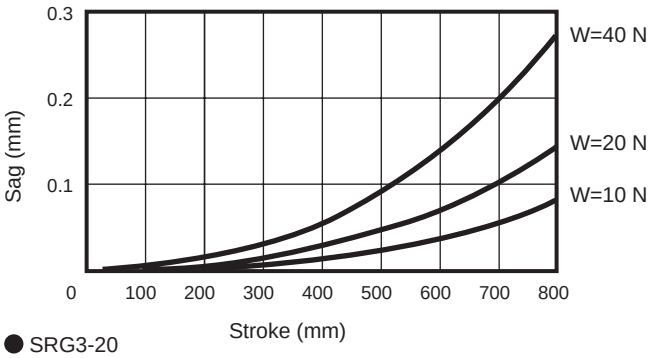
1 Sag of cylinder tube δ



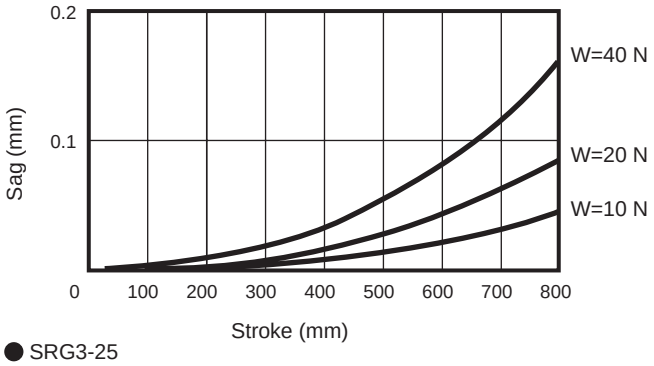
● SRG3-12



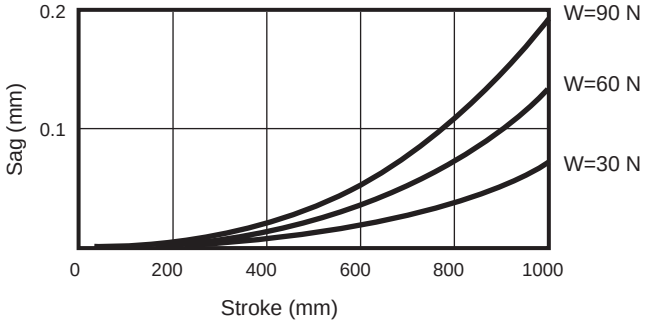
● SRG3-16



● SRG3-20

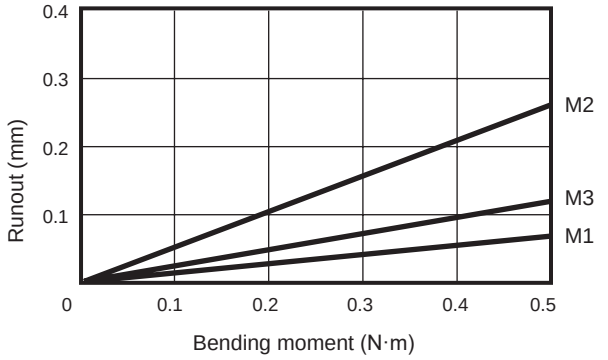


● SRG3-25

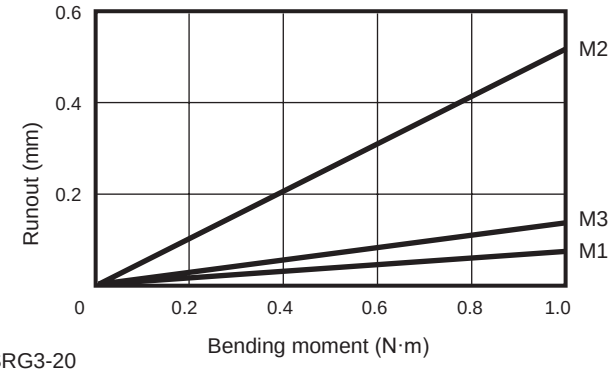


2 Runout of table (Runout at 70 mm from the center of the cylinder)

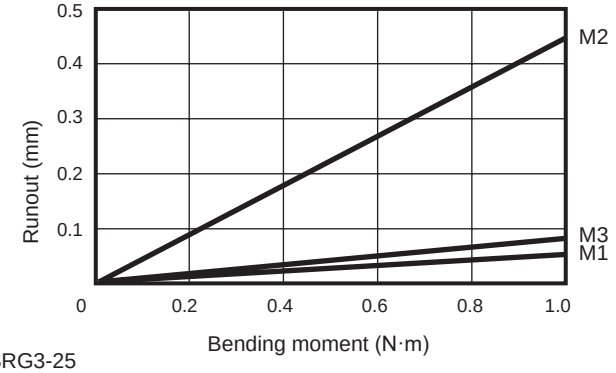
● SRG3-12



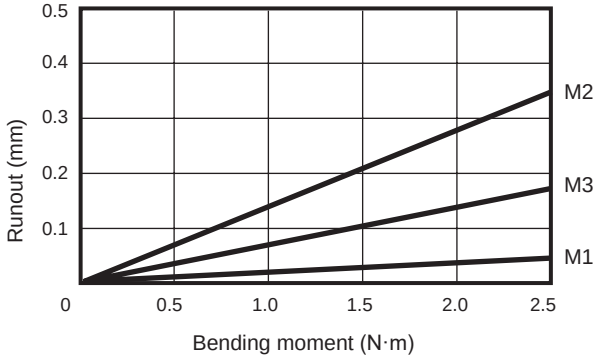
● SRG3-16



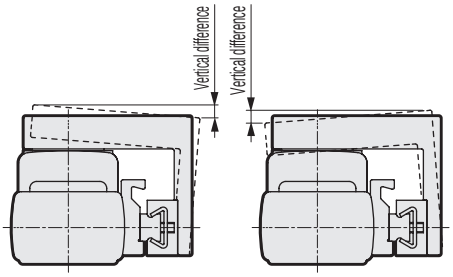
● SRG3-20



● SRG3-25



Note: This table has a vertical tilt when without load, separate from the table displacement noted above. (Refer to table below)



Vertical difference (reference value)

Bore size	Vertical difference (MAX)
ø12	0.9mm
ø16	1.0mm
ø20	1.1mm
ø25	1.5mm

3 How to check the full stroke adjusting unit

(1)Checking the allowable colliding energy of shock absorber

Calculate the colliding object equivalent weight Me and the colliding energy E from the formula in the table below. Confirm that Me and E are within the allowable values shown in Figure 3. Also, confirm that the operating frequency, colliding speed and other specifications are within the allowable values in Table 11. Note that the allowable colliding object equivalent weight Me and allowable colliding energy E change depending on the colliding speed.

● Code
E: Colliding energy (J)
Me: Colliding object equivalent weight (kg)
m: Workpiece weight (kg)
F: Cylinder thrust (N)
V: Colliding speed (m/s)
St: Shock absorber stroke (m)
g: Gravity acceleration 9.8 $(m/s)^2$)

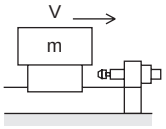
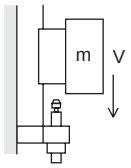
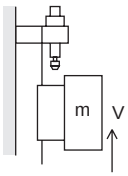
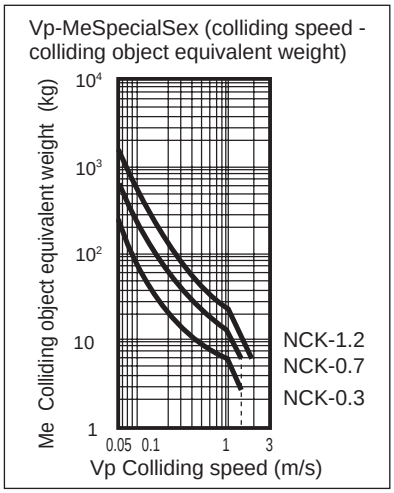
	Horizontal travel	Vertical down	Vertical up
Applications			
Colliding object equivalent weight Me (kg)	$Me = m + \frac{2F \cdot St}{V^2}$	$Me = m + \frac{2 \cdot St\,(F+mg)}{V^2}$	$Me = m + \frac{2 \cdot St(F-mg)}{V^2}$
Energy E (J)	$E = \frac{mV^2}{2} + F \cdot St$	$E = \frac{mV^2}{2} + (F+mg) \cdot St$	$E = \frac{mV^2}{2} + (F-mg) \cdot St$

Fig. 3 Allowable colliding object equivalent weight



(2) Shock absorber

Table 6 Specifications

Type		For SRG3-12/16	For SRG3-20	For SRG3-25
Shock absorber model No. / Descriptions		NCK-00-0.3-C	NCK-00-0.7-C	NCK-00-1.2
Type/Classification		Spring return without adjuster		
Max. absorbed energy J		3	7	12
Stroke mm		6	8	10
Hourly Max. energy absorption kJ/hour		6.3	12.6	21.6
Max. colliding speed m/s		1.5		2.0
Max. operating frequency cycles/min.		35	30	
Ambient temperature °C		−10 to 80		
Required mounting strength N		3540	6150	8400
Return time S		0.3 or less		
Product weight kg		0.012	0.02	0.04
Return Spring force	When extended N	2.9	2.0	2.9
	When compressed N	4.5	4.3	5.9

(3) Example of calculation (SRG3-20)

● Example of calculation

Rising and lowering

Working conditions

● Applied load M 1 (kg)

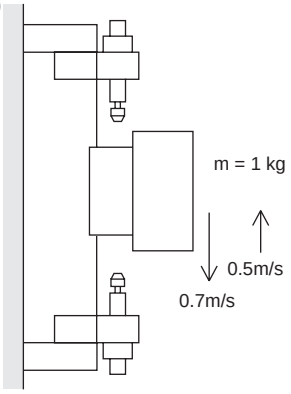
● Colliding speed

Rising 0.5 (m/s)

Lowering 0.7 (m/s)

● Working pressure 0.5 (MPa)

(157 N)



①Kinetic energy when rising (E_1)

$$E_1 = \frac{1 \times 0.5^2}{2} + (157 - 1 \times 9.8) \times 0.008$$

$= 1.30$ (J)

The kinetic energy (E_1) is less than 1/2 of the max. energy absorption in Table 12 and can be absorbed.

$$Me = 1 + \frac{2 \times 0.008 (157 - 1 \times 9.8)}{0.5^2}$$

$= 10.42$ (kg)

From Figure 4, Me at V=0.5 (m/s) of the shock absorber for SRG3-20 is 18 kg.,Absorbable

②Kinetic energy when falling (E_1)

$$E_1 = \frac{1 \times 0.7^2}{2} + (157 + 1 \times 9.8) \times 0.008$$

$= 1.58$ (J)

The kinetic energy (E) is less than 1/2 of the max. energy absorption in Table 6 and$_1$)is allowable

$$Me = 1 + \frac{2 \times 0.008 (157 + 1 \times 9.8)}{0.7^2}$$

$= 6.45$ (kg)

From Figure 4, Me at V = 0.7 (m/s) of the shock absorber for SRG3-20 is 16 kg. Therefore, the result is allowable.

● Example calculation (2)

Horizontal

Working conditions

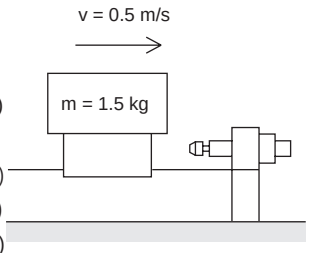
Load weight M 1.5 (kg)

Colliding speed

Horizontal direction 0.5 (m/s)

Working pressure 0.3 (MPa)

(94 N)



Horizontal kinetic energy (E_1)

$$E_1 = \frac{1.5 \times 0.5^2}{2} + 94 \times 0.08$$

$= 0.94$ (J)

The kinetic energy (E_1) is less than 1/2 of the max. energy absorption in Table 12 and can be absorbed.

$$Me = 1.5 + \frac{2 \times 94 \times 0.008}{0.5^2}$$

$= 1.53$ (kg)

V=0.5 from Fig. 4 (m/s)The Me value of the shock absorber for SRG3-20 at is 18kg. Therefore, 1.53 < 18 is allowable.

(Note) Refer to 9 Step 9 (Confirmation of inertia load) and keep the inertia load within the allowable value.