

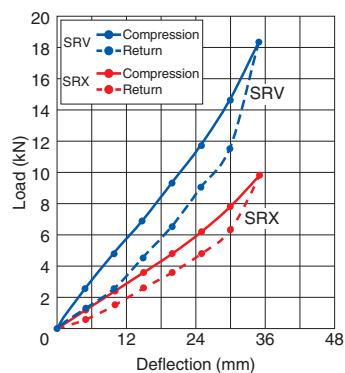
Rubber Spring SRV [Overview]

Pressure Source Components

Load is increased twice compared to the previous type.

With innovation of material and manufacturing, SRV has improved performances in various characteristics; load, permanent set, durability, etc. The cost effectiveness is excellent compared to coil springs or urethane springs.

● Load comparison: Example of $\phi 63-100$



Features

- Durability: With 35% deflection, durability of 300,000 strokes is achieved. It is excellent in oil resistance, chemical resistance, heat resistance, dust resistance and corrosion resistance.
- Permanent set: With 35% deflection, 4% or less permanent set is achieved at 300,000 strokes. Permanent distortion appears extreme by 10,000 strokes, progresses gradually to 50,000 strokes, and then stabilizes.
- Maximum deflection: 35%
- Double stack can be allowed when the allowable maximum deflection is 30% or less and L/D is 1.6 or less.

Bulge of Outer Diameter

When the SRV is compressed, the outer diameter is bulged. The bulge rate is not relevant to the spring size. It is proportional to the deflection rate and the rate is almost constant of $\Delta D = 0.86 \delta$. The required clearance between the maximum bulge diameter and the wall is at least 5 mm.

$$\text{Bulge rate of outer diameter : } \Delta D = \frac{\phi D\delta - \phi D_0}{\phi D_0} \times 100\%$$

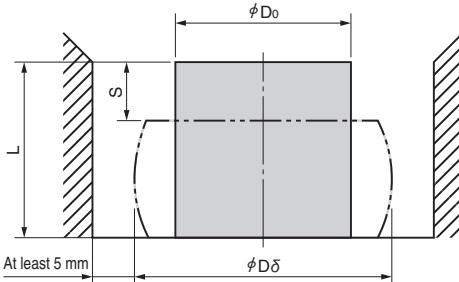
$$\text{Deflection rate: } \delta = \frac{S}{L} \times 100\%$$

Where

ϕD_0 :Initial outer diameter mm, L : Initial length mm

$\phi D\delta$:Maximum outer diameter mm, S:Deflection mm

$$\text{Therefore, } \phi D\delta = (1+0.86 \frac{S}{L}) \times \phi D_0$$



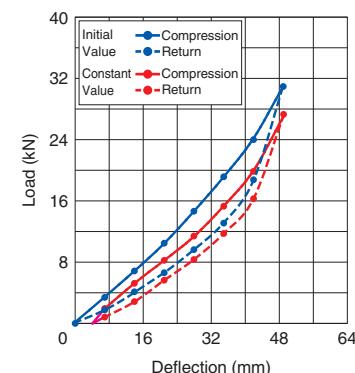
Storage

- In order to protect against ultraviolet rays, store away from direct sunlight.
 - Deterioration is faster under conditions of high temperature or humidity.
- We recommend putting a desiccant in the container and storing in as cool a location as possible.

Load - Stroke Design

Refer to the SRV "load - deflection diagram" for load design. Use the compression line (solid line) for the load - deflection diagram.

SRV80-140



Application range

1. Heat resistance

When the SRV is repeatedly compressed, it generates heat with hysteresis effect. Temperature rise reaches a balanced value and becomes constant around 1,000 strokes. The larger volume, deflection rate and strokes per minute (spm) are, the larger temperature. Continuous heat resistance of the SRV is 80°C.

2. Dust resistance

The SRV is very resistant to the atmosphere with much dust or machined powder. If such dust or powder is buried in the pressurizing surface or fixed area, crack does not grow. Use the SRV as it is.

3. Scratch resistance

If the SRV has scratches in the compression direction, it may not be broken immediately. It is better to replace it at an early stage.

4. Durability

At the deflection of 35%, the durability is 300,000 strokes.

5. Oil resistance and chemical resistance

| | | | |
|-------------------|---|-------------------|---|
| Water | 1 | Acetone | 3 |
| Ethyl Alcohol | 2 | Ammonia | 2 |
| Paint Thinner | 2 | Rust Proofing Oil | X |
| Hydrochloric Acid | X | Trichlene | X |
| Sulfuric Acid | X | Oxalic Acid | 2 |
| Nitric Acid | X | Tar | 2 |
| Grinding Oil | 2 | Toluene | X |
| Machine Oil | 3 | Phenol | 3 |
| Grease | 3 | Benzene | X |
| Gasoline | X | Acetic Acid | X |
| Brine | 1 | Glycerin | 2 |
| Methyl alcohol | 2 | | |

1 = excellent resistance

2 = good resistance

3 = mediocre resistance

X = not resistant

Conditions for Use

- Use at or below the stated deflection ratio.
- The urethane spring seating surface requires an external diameter of > 20 mm.
- The clearance around each spring must be sufficient to prevent any contact with the neighboring components.
- Exposure to ultraviolet and sunlight must be avoided.
- Guide pins should be S25C equivalent or better and finished within Ra1.6.
- Since rubber springs have adsorptive properties, be careful not to drop parts when disassembling press dies.
- Note that the rubber spring may come loose from the retainer due to its adsorptive properties and may not hit the seat parallel to the seat surface.
- If holding force is required to prevent the Rubber Spring from coming off, use a Rubber Spring with SORTB of the Retainer with enhanced holding force.

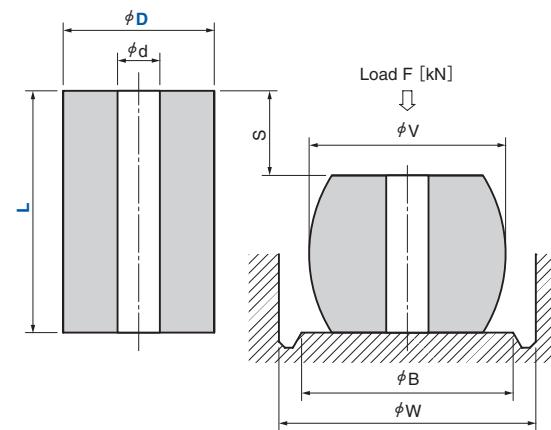
Rubber Spring

High Load Type

Pressure Source Components

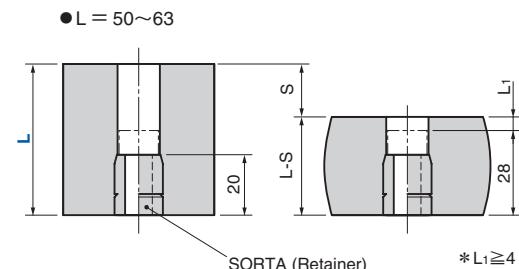
SRV

CAD
FILE

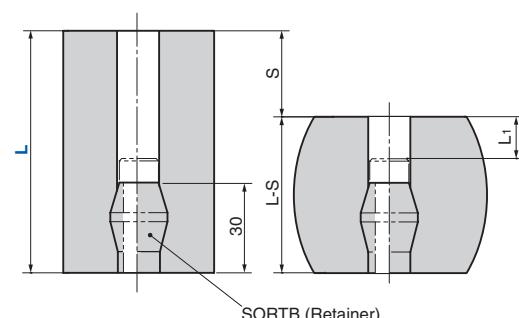


SRVT (with Retainer)

CAD
FILE



● L = 80 or more



⟨Material⟩ Special blend rubber

Refer to page 1191 for attached retainer size.

| Catalog No. | D | L | S = Lx35% | | | | | B | W | d | Hardness | Retainer used for SRVT | | | | | |
|-------------|-----|------|-----------|----------------------|---------------------------------|------|----------------|------|----|----|------------|------------------------|--|--|--|--|--|
| | | | S | Initial Value F [kN] | Stabilized Value (5~30 strokes) | | L ₁ | | | | | | | | | | |
| | | | | | F [kN] | V | | | | | | | | | | | |
| 50 | 50 | 17.5 | 12 | 10 | 65 | 4.5 | 70 | ≥75 | 14 | 87 | SORTA14-20 | | | | | | |
| | 63 | 22.0 | | | | | | | | | | SORTB14 | | | | | |
| | 80 | 28.0 | | | | | | | | | | SORTA14-20 | | | | | |
| 63 | 100 | 35.0 | 18 | 16 | 81 | 13.0 | 85 | ≥91 | 22 | 86 | SRVT | | | | | | |
| | 63 | 22.0 | | | | | | | | | | SORTA14-20 | | | | | |
| | 80 | 28.0 | | | | | | | | | | SORTB14 | | | | | |
| SRV SRVT | 100 | 35.0 | 31 | 27 | 104 | 23.0 | 110 | ≥114 | 22 | 86 | SRVT | | | | | | |
| | 125 | 44.0 | | | | | | | | | | SORTB22 | | | | | |
| | 80 | 28.0 | | | | | | | | | | SORTB22 | | | | | |
| 80 | 100 | 35.0 | 49 | 42 | 129 | 39.0 | 130 | ≥139 | 22 | 86 | SRVT | | | | | | |
| | 125 | 44.0 | | | | | | | | | | SORTB22 | | | | | |
| | 140 | 49.0 | | | | | | | | | | SORTB22 | | | | | |
| 100 | 160 | 56.0 | 49 | 42 | 129 | 49.0 | 130 | ≥139 | 22 | 86 | SRVT | | | | | | |
| | 100 | 35.0 | | | | | | | | | | SORTB22 | | | | | |
| | 125 | 44.0 | | | | | | | | | | SORTB22 | | | | | |
| | 140 | 49.0 | | | | | | | | | | SORTB22 | | | | | |
| | 160 | 56.0 | | | | | | | | | | SORTB22 | | | | | |
| | 100 | 35.0 | | | | | | | | | | SORTB22 | | | | | |



Catalog No. D – L
SRV 63 – 100
SRVT 80 – 140

Refer to page 1192 for the spacer for stack use of springs.

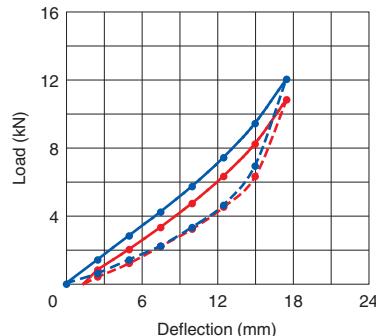
- Retainers are SORTA for overall rubber spring lengths of 40, 50, and 63 mm, and SORTB for overall rubber spring lengths of 80 mm and longer.
- Since rubber springs have adsorptive properties, be careful not to drop parts when disassembling molds.

Rubber Spring

SRV Load-Deflection Diagrams

Pressure Source Components

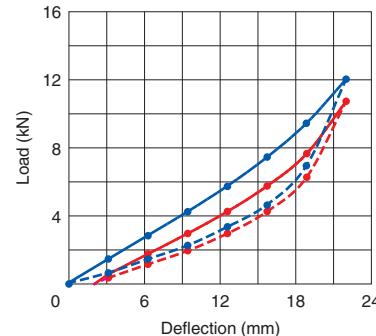
SRV50-50



● Load in compression (reference)

| Deflection [mm] | 9.5 | 11.5 | 13.5 | 15.5 |
|-----------------|-----|------|------|------|
| Load [kN] | 4.4 | 5.5 | 7.0 | 8.6 |

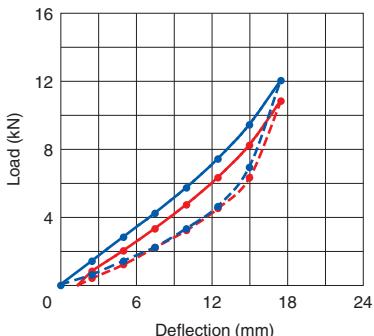
SRV50-63



● Load in compression (reference)

| Deflection [mm] | 14.0 | 16.0 | 18.0 | 20.0 |
|-----------------|------|------|------|------|
| Load [kN] | 4.7 | 5.7 | 6.9 | 8.4 |

SRV63-63

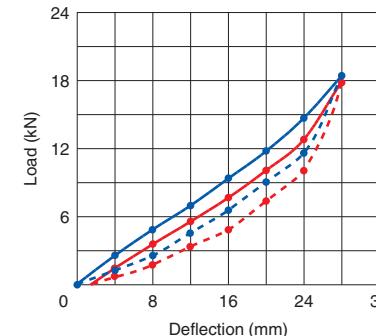


● Load in compression (reference)

| Deflection [mm] | 14.0 | 16.0 | 18.0 | 20.0 |
|-----------------|------|------|------|------|
| Load [kN] | 8.5 | 10.0 | 12.0 | 14.0 |

Initial Value Compression Value Constant Value Return Value Compression Return

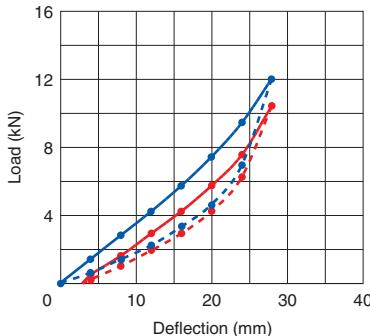
SRV63-80



● Load in compression (reference)

| Deflection [mm] | 20.0 | 22.0 | 24.0 | 26.0 |
|-----------------|------|------|------|------|
| Load [kN] | 10.0 | 11.3 | 12.7 | 15.2 |

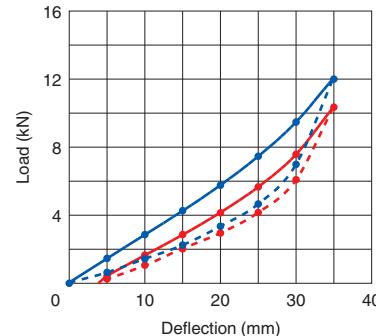
SRV50-80



● Load in compression (reference)

| Deflection [mm] | 20.0 | 22.0 | 24.0 | 26.0 |
|-----------------|------|------|------|------|
| Load [kN] | 5.7 | 6.4 | 7.5 | 8.6 |

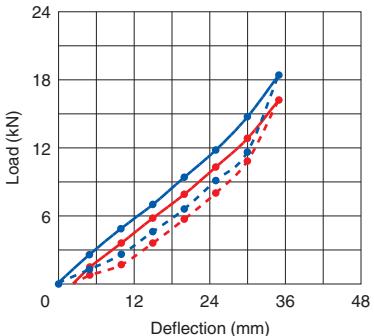
SRV50-100



● Load in compression (reference)

| Deflection [mm] | 27.0 | 29.0 | 31.0 | 33.0 |
|-----------------|------|------|------|------|
| Load [kN] | 6.3 | 7.0 | 8.0 | 9.0 |

SRV63-100



● Load in compression (reference)

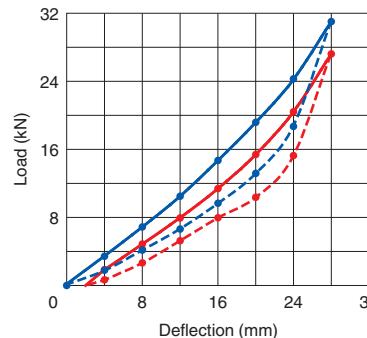
| Deflection [mm] | 27.0 | 29.0 | 31.0 | 33.0 |
|-----------------|------|------|------|------|
| Load [kN] | 11.1 | 12.2 | 13.4 | 14.7 |

Rubber Spring

SRV Load-Deflection Diagrams

Pressure Source Components

SRV80-80

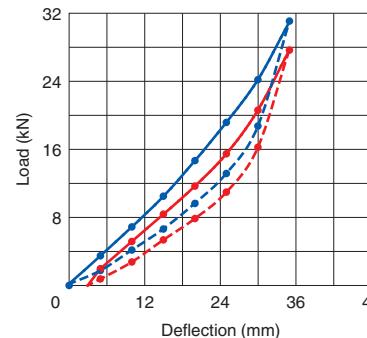


| Load | Deflection mm | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 |
|----------------------------------|---------------|-----|-----|-----|------|------|------|------|------|
| Initial Value | Compression | 0.0 | 3.3 | 6.7 | 10.3 | 14.5 | 19.0 | 24.0 | 30.8 |
| Return | Compression | 0.0 | 1.6 | 4.0 | 6.5 | 9.5 | 13.0 | 18.5 | 30.8 |
| Constant value 5~300,000 strokes | Compression | — | 1.7 | 4.7 | 7.8 | 11.2 | 15.2 | 20.2 | 27.0 |
| Return | Compression | — | 0.5 | 2.5 | 5.1 | 7.8 | 10.2 | 15.0 | 27.0 |

● Load in compression (reference)

| Deflection [mm] | 20.0 | 22.0 | 24.0 | 26.0 |
|-----------------|------|------|------|------|
| Load [kN] | 15.2 | 17.5 | 20.2 | 23.4 |

SRV80-100

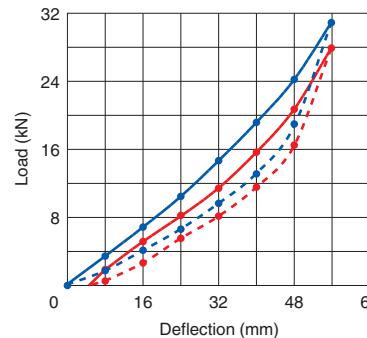


| Load | Deflection mm | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
|----------------------------------|---------------|-----|-----|-----|------|------|------|------|------|
| Initial Value | Compression | 0.0 | 3.3 | 6.7 | 10.3 | 14.5 | 19.0 | 24.0 | 30.8 |
| Return | Compression | 0.0 | 1.6 | 4.0 | 6.5 | 9.5 | 13.0 | 18.5 | 30.8 |
| Constant value 5~300,000 strokes | Compression | — | 1.8 | 5.0 | 8.2 | 11.5 | 15.3 | 20.4 | 27.5 |
| Return | Compression | — | 0.6 | 2.6 | 5.2 | 7.7 | 10.8 | 16.0 | 27.5 |

● Load in compression (reference)

| Deflection [mm] | 27.0 | 29.0 | 31.0 | 33.0 |
|-----------------|------|------|------|------|
| Load [kN] | 17.2 | 19.3 | 21.7 | 24.4 |

SRV80-160

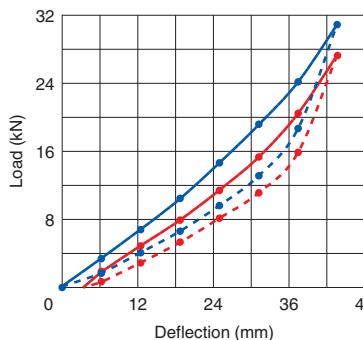


| Load | Deflection mm | 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 |
|----------------------------------|---------------|-----|-----|-----|------|------|------|------|------|
| Initial Value | Compression | 0.0 | 3.3 | 6.7 | 10.3 | 14.5 | 19.0 | 24.0 | 30.8 |
| Return | Compression | 0.0 | 1.6 | 4.0 | 6.5 | 9.5 | 13.0 | 18.5 | 30.8 |
| Constant value 5~300,000 strokes | Compression | — | 1.7 | 5.0 | 8.0 | 11.3 | 15.5 | 20.5 | 27.8 |
| Return | Compression | — | 0.4 | 2.5 | 5.4 | 8.0 | 11.4 | 16.2 | 27.8 |

● Load in compression (reference)

| Deflection [mm] | 48.0 | 50.0 | 52.0 | 54.0 |
|-----------------|------|------|------|------|
| Load [kN] | 20.5 | 22.2 | 24.0 | 25.8 |

SRV80-125

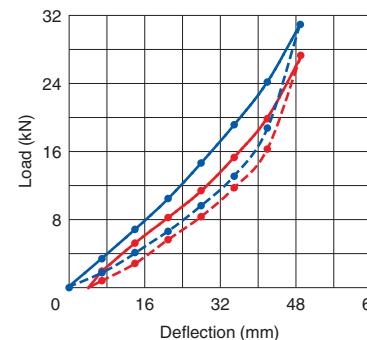


| Load | Deflection mm | 0 | 6.0 | 12.5 | 19.0 | 25.0 | 31.0 | 38.0 | 44.0 |
|----------------------------------|---------------|-----|-----|------|------|------|------|------|------|
| Initial Value | Compression | 0.0 | 3.3 | 6.7 | 10.3 | 14.5 | 19.0 | 24.0 | 30.8 |
| Return | Compression | 0.0 | 1.6 | 4.0 | 6.5 | 9.5 | 13.0 | 18.5 | 30.8 |
| Constant value 5~300,000 strokes | Compression | — | 1.7 | 4.8 | 7.8 | 11.3 | 15.2 | 20.3 | 27.2 |
| Return | Compression | — | 0.5 | 2.8 | 5.2 | 8.0 | 11.0 | 15.7 | 27.2 |

● Load in compression (reference)

| Deflection [mm] | 36.0 | 38.0 | 40.0 | 42.0 |
|-----------------|------|------|------|------|
| Load [kN] | 19.0 | 20.3 | 22.9 | 25.1 |

SRV80-140



| Load | Deflection mm | 0 | 7 | 14 | 21 | 28 | 35 | 42 | 49 |
|----------------------------------|---------------|-----|-----|-----|------|------|------|------|------|
| Initial Value | Compression | 0.0 | 3.3 | 6.7 | 10.3 | 14.5 | 19.0 | 24.0 | 30.8 |
| Return | Compression | 0.0 | 1.6 | 4.0 | 6.5 | 9.5 | 13.0 | 18.5 | 30.8 |
| Constant value 5~300,000 strokes | Compression | — | 1.8 | 5.1 | 8.1 | 11.2 | 15.2 | 19.8 | 26.8 |
| Return | Compression | — | 0.7 | 2.7 | 5.5 | 8.2 | 11.6 | 16.1 | 26.8 |

● Load in compression (reference)

| Deflection [mm] | 41.0 | 43.0 | 45.0 | 47.0 |
|-----------------|------|------|------|------|
| Load [kN] | 19.2 | 20.8 | 22.6 | 24.6 |

Initial Value Compression Constant Value Compression
 —●— Compression -●--- Return -○--- Constant Value -○--- Return

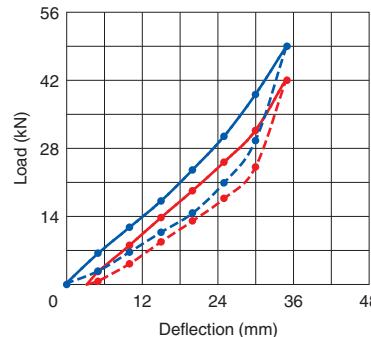
Rubber Spring

SRV Load-Deflection Diagrams

Pressure Source Components

Initial Value Compression Value Constant Value Return Value

SRV100-100

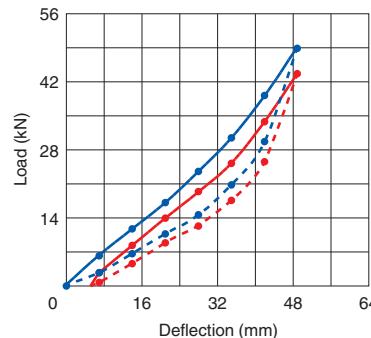


| Load | Deflection mm | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
|----------------------------------|---------------|-----|-----|------|------|------|------|------|------|
| Initial Value | Compression | 0.0 | 6.1 | 11.5 | 16.9 | 23.3 | 30.2 | 38.8 | 48.9 |
| | Return | 0.0 | 2.5 | 6.4 | 10.5 | 14.4 | 20.6 | 29.2 | 48.9 |
| Constant value 5~300,000 strokes | Compression | - | 2.4 | 7.8 | 13.5 | 19.0 | 24.9 | 31.4 | 42.2 |
| | Return | - | 0.4 | 4.0 | 8.5 | 12.8 | 17.4 | 23.8 | 42.2 |

● Load in compression (reference)

| Deflection [mm] | 27.0 | 29.0 | 31.0 | 33.0 |
|-----------------|------|------|------|------|
| Load [kN] | 27.4 | 30.4 | 33.8 | 37.7 |

SRV100-140

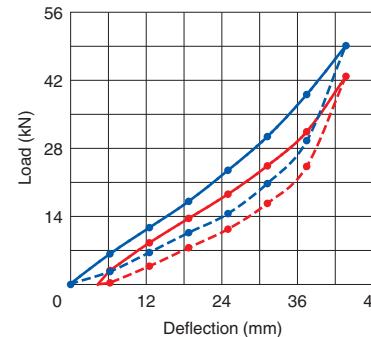


| Load | Deflection mm | 0 | 7 | 14 | 21 | 28 | 35 | 42 | 49 |
|----------------------------------|---------------|-----|-----|------|------|------|------|------|------|
| Initial Value | Compression | 0.0 | 6.1 | 11.5 | 16.9 | 23.3 | 30.2 | 38.8 | 48.9 |
| | Return | 0.0 | 2.5 | 6.4 | 10.5 | 14.4 | 20.6 | 29.2 | 48.9 |
| Constant value 5~300,000 strokes | Compression | - | 2.5 | 8.1 | 13.7 | 19.1 | 25.0 | 33.5 | 43.5 |
| | Return | - | 0.5 | 4.4 | 8.7 | 12.2 | 17.4 | 25.2 | 43.5 |

● Load in compression (reference)

| Deflection [mm] | 41.0 | 43.0 | 45.0 | 47.0 |
|-----------------|------|------|------|------|
| Load [kN] | 32.0 | 34.6 | 37.4 | 40.3 |

SRV100-125



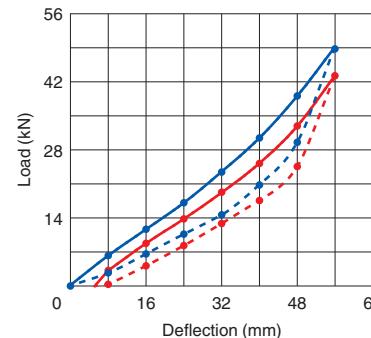
| Load | Deflection mm | 0 | 6.0 | 12.5 | 19.0 | 25.0 | 31.0 | 38.0 | 44.0 |
|----------------------------------|---------------|-----|-----|------|------|------|------|------|------|
| Initial Value | Compression | 0.0 | 6.1 | 11.5 | 16.9 | 23.3 | 30.2 | 38.8 | 48.9 |
| | Return | 0.0 | 2.5 | 6.4 | 10.5 | 14.4 | 20.6 | 29.2 | 48.9 |
| Constant value 5~300,000 strokes | Compression | - | 2.7 | 8.4 | 13.4 | 18.4 | 24.2 | 31.2 | 42.5 |
| | Return | - | 0.2 | 3.6 | 7.4 | 11.2 | 16.5 | 24.0 | 42.5 |

● Load in compression (reference)

| Deflection [mm] | 36.0 | 38.0 | 40.0 | 42.0 |
|-----------------|------|------|------|------|
| Load [kN] | 29.5 | 31.2 | 35.5 | 39.0 |

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SRV100-160



| Load | Deflection mm | 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 |
|----------------------------------|---------------|-----|-----|------|------|------|------|------|------|
| Initial Value | Compression | 0.0 | 6.1 | 11.5 | 16.9 | 23.3 | 30.2 | 38.8 | 48.9 |
| | Return | 0.0 | 2.5 | 6.4 | 10.5 | 14.4 | 20.6 | 29.2 | 48.9 |
| Constant value 5~300,000 strokes | Compression | - | 3.0 | 8.6 | 13.6 | 19.0 | 25.0 | 32.6 | 43.0 |
| | Return | - | 0.2 | 4.0 | 8.2 | 12.6 | 17.4 | 24.2 | 43.0 |

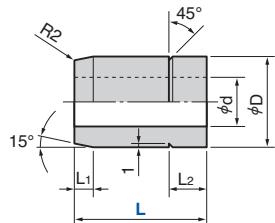
● Load in compression (reference)

| Deflection [mm] | 48.0 | 50.0 | 52.0 | 54.0 |
|-----------------|------|------|------|------|
| Load [kN] | 32.6 | 35.0 | 37.5 | 40.1 |

Retainer, Spacer

Pressure Source Components

SORTA

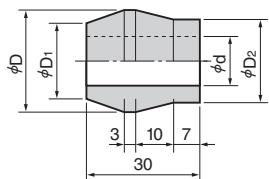


⟨Material⟩ SS400 or S25C

| Catalog No. | Nominal | L | D | d | L ₁ | L ₂ | Applicable Rubber Spring, Urethane Spring | |
|-------------|---------|----|----|----|----------------|----------------|---|--------|
| | | | | | | | Outer Diameter | Length |
| SORTA | 10 | | | | 2 | 3 | 30, 40 | ~40 |
| | 14 | 20 | 16 | 9 | 3 | 7 | 30~63 | 50~63 |
| | | | | | | | 30~63 | 60~125 |
| | 20 | 30 | 22 | 13 | 5 | 10 | 60~ | 60~120 |
| | 22 | 35 | 24 | | | | 70~100 | 60~200 |

Order Catalog No. Nominal – L
SORTA 20 – 30

SORTB



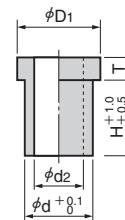
⟨Material⟩ SS400 or S25C

| Catalog No. | Nominal | D | D ₁ | D ₂ | d | Outer Diameter |
|-------------|---------|----|----------------|----------------|----|----------------|
| SORTB | 14 | 19 | 13 | 14 | 9 | 50 63 |
| | 22 | 27 | 20 | 22 | 13 | 80 100 |

When installing SORTB, set the straight part to the fixed surface side.

Order Catalog No. Nominal
SORTB 14

K

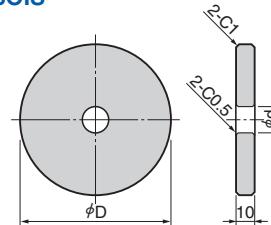


⟨Material⟩ SS400

| Catalog No. | Nominal | D ₁ | d | d ₂ | H | T |
|-------------|---------|----------------|----|----------------|----|---|
| K | 10 | 19.5 | 15 | 11 | 12 | 5 |
| | 12 | 22 | 18 | 13 | 20 | 6 |

Order Catalog No. Nominal
K 10

SOIS



⟨Material⟩ Neoden (#25-61N)

| Catalog No. | Nominal | D | d | Applicable Rubber Spring, Urethane Spring | | |
|-------------|---------|-----|----|---|----------------|--------------------|
| | | | | Outer Diameter | Inner Diameter | Guide Pin Diameter |
| SOIS | 50 | 65 | | 30 40 50 | | 14 |
| | 63 | 80 | 13 | 60 63 | | 12 |
| | 80 | 100 | | 70 80 | | 20 |
| | 100 | 125 | 21 | 90 100 110 | 22 | 20 |

Guide pins should be S25C equivalent or better and finished within Ra1.6.

Order Catalog No. Nominal
SOIS 63