

Pretensioning Elements

Type 9420A01 ... 9420A71

Set of Pretensioning Elements for Load Washers

The standardized pretensioning elements are used for mounting the force load washers Types 9001A ... 9071A and torque load washers Types 9039 ... 9069.

- Elastic pretension screw, optimized for tension and compression force measurement
- Low force shunt
- Ground-isolated mounting warranted

Description

A Set of pretensioning elements consists of a pretensioning bolt (PB, high strength, stainless steel of the mold), a centring sleeve (CS), two insulating washers (IW) and a hexagon nut (HN). These accessories are separately available on request.

Application

Pretensioning of load washers and torque sensors for optimized introduction of force; ground insulated mounting.

Mounting

Pretensioned load washers can measure both tensile and compression forces. The pretension needed is also governed by the anticipated lateral forces which produce a bending moment. For details see instruction manual 9001A_002-032.

The pretension bolt is screwed into the base plate and the thread secured with adhesive (e.g. Loctite® 121™). The sensor is centered using the centering sleeve.

Before assembly, the contact surfaces of the base and cover plates as well as on the sensor must be carefully cleaned with a degreasing cleaning agent.

The two insulating washers allow ground-insulated mounting. Before screwing in the pretension nut, the contact surface and the threads of the pretension bolt should be greased with special grease Type 1063.

Load washers Type 9039/49/69 will be pretensioned with a defined torque.

When the load washers Type 9001A ... 9071A are connected to the charge amplifier, the pretension force can be measured directly as the pretension nut is tightened. Pretensioning of the load washer produces a force shunt. To measure the sensitivity of the pretensioned sensor, recalibration is necessary.



Technical Data

| Type | | 9420A01 | 9420A11 | 9420A21 | 9420A31 |
|------------------|-----------|---------|-----------------|-----------------|--------------------------|
| for sensor | Type | 9001A | 9011A/ 9101A | 9021A/ 9102A | 9031A/ 9103A/ 9039 |
| Inner ø sensor | mm | 4,1 | 6,5 | 10,5 | 13 |
| Pretension bolt | | | | | |
| | Thread | M4x0,5 | M5x0,5 | M8x1 | M10x1 |
| | L, length | mm 22 | 28 | 40 | 46 |
| Pretension force | kN | 4 | 7 | 18 | 30/15 ²⁾ |
| Shunt | % | ≈10 | ≈7 | ≈8 | ≈9 |

| Type | | 9420A41 | 9420A51 | 9420A61 | 9420A71 |
|------------------|-----------|--------------------------|-----------------|--------------------------|-----------------|
| for sensor | Type | 9041A/ 9104A/ 9049 | 9051A/ 9105A | 9061A/ 9106A/ 9069 | 9071A/ 9107A |
| Inner ø sensor | mm | 17 | 21 | 26,5 | 40,5 |
| Pretension bolt | | | | | |
| | Thread | M12x1 | M14x1,5 | M20x1,5 | M27x2 |
| | L, length | mm 60 | 62 | 80 | 102 |
| Pretension force | kN | 45/25 ²⁾ | 60 | 100/120 ²⁾ | 200 |
| Shunt | % | ≈8 | ≈7 | ≈7 | ≈7 |

Recommended materials for environment of sensor (e.g. cover and base plate, Fig. 5) Quenched and drawn

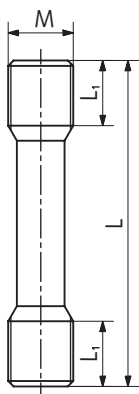
| | | | |
|----------|----------------------|----------------------|--------|
| W.-Nr. | 1.4045 ¹⁾ | 1.4021 ¹⁾ | 1.1191 |
| DIN | x22CrNi17 | x20Cr13 | Ck45 |
| AFNOR | Z15CN16-02 | Z20C13 | xC45 |
| B.S. | 431S29 | 420S37 | M46 |
| JIS | SUS431 | SUS420J1 | S45C |
| AISI/SAE | 431 | 420 | 1045 |

¹⁾ rust-resistant

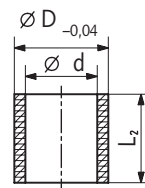
²⁾ Pretensioning force see data sheet 9039_000-111

Overview Set Components

| Pretensioning Set Type | for Sensor Type | consisting of | | | |
|------------------------|------------------|---------------|---------|---------|---------|
| | | PB Type | CS Type | IW Type | HN Type |
| 9420A01 | 9001A | 9502 | 9504 | 9508 | 9506 |
| 9420A11 | 9011A/9101A | 9512 | 9514 | 9518 | 9516 |
| 9420A21 | 9021A/9102A | 9522 | 9524 | 9528 | 9526 |
| 9420A31 | 9031A/9103A/9039 | 9532 | 9534 | 9538 | 9536 |
| 9420A41 | 9041A/9104A/9049 | 9542 | 9544 | 9548 | 9546 |
| 9420A51 | 9051A/9105A | 9552 | 9554 | 9558 | 9556 |
| 9420A61 | 9061A/9106A/9069 | 9562 | 9564 | 9568 | 9566 |
| 9420A71 | 9071A/9107A | 9572 | 9574 | 9578 | 9576 |



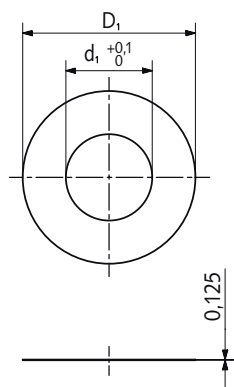
| Type | H | M | L | L ₁ |
|------|-----|---------|-----|----------------|
| 9502 | 6,5 | M4x0,5 | 22 | 4 |
| 9512 | 8 | M5x0,5 | 28 | 5 |
| 9522 | 10 | M8x1 | 40 | 8 |
| 9532 | 11 | M10x1 | 46 | 10 |
| 9542 | 12 | M12x1 | 60 | 12 |
| 9552 | 13 | M14x1,5 | 62 | 13 |
| 9562 | 15 | M20x1,5 | 80 | 19 |
| 9572 | 17 | M27x2 | 102 | 26 |



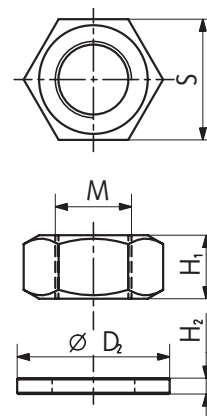
| Type | D | d | L ₂ |
|------|------|------|----------------|
| 9504 | 4,1 | 3,0 | 10,5 |
| 9514 | 6,5 | 4,0 | 12 |
| 9524 | 10,5 | 8,5 | 14 |
| 9534 | 13 | 11 | 15 |
| 9544 | 17 | 13 | 16 |
| 9554 | 21 | 17 | 17 |
| 9564 | 26,5 | 22,5 | 19 |
| 9574 | 40,5 | 36,5 | 21 |

Fig. 1: Pretensioning bolt PB

Fig. 2: Centering sleeve CS



| Type | D ₁ | d ₁ |
|------|----------------|----------------|
| 9508 | 10,4 | 4,1 |
| 9518 | 14,4 | 6,5 |
| 9528 | 22 | 10,5 |
| 9538 | 28 | 13 |
| 9548 | 34 | 17 |
| 9558 | 39,6 | 21 |
| 9568 | 51,6 | 26,5 |
| 9578 | 75 | 40,5 |



| Type | H ₁ | S | D ₂ | H ₂ |
|------|----------------|----|----------------|----------------|
| 9506 | 3,2 | 7 | 9 | 0,8 |
| 9516 | 4 | 8 | 10 | 1 |
| 9526 | 6,5 | 13 | 16 | 1,6 |
| 9536 | 8 | 17 | 18 | 1,6 |
| 9546 | 10 | 19 | 24 | 2,5 |
| 9556 | 11 | 22 | 28 | 2,5 |
| 9566 | 16 | 30 | 37 | 3 |
| 9576 | 22 | 41 | 50 | 4 |

Fig. 3: Insulating washer IW

Fig. 4: Hexagonal nut (incl. washer) HN

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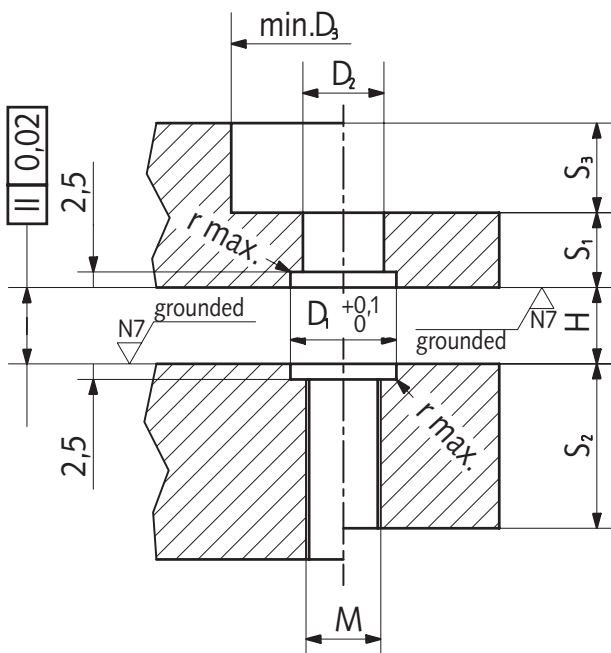


Fig 5: Preparing the mounting surfaces and the bores in the base and cover plates, recommended material see page 1
(Limit of elasticity $R_e > 500 \text{ N/mm}^2$)

Mounting Dimensions

| Set Type | Dimensions | | | | | | | |
|----------|------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|
| | M | D ₁ | D ₂ | D ₃ | S ₁ | S ₂ | S ₃ | H |
| 9420A01 | M4x0,5 | 4,1 | 4,1 | 12 | 3,5 | 10 | 6 | 6,5 |
| 9420A11 | M5x0,5 | 6,5 | 5,1 | 15 | 5,5 | 12 | 7 | 8 |
| 9420A21 | M8x1 | 10,5 | 8,1 | 20 | 8 | 17 | 11 | 10 |
| 9420A31 | M10x1 | 13 | 10,2 | 26 | 10 | 20 | 12 | 11 |
| 9420A41 | M12x1 | 17 | 12,2 | 28 | 13 | 25 | 15 | 12 |
| 9420A51 | M14x1,5 | 21 | 14,2 | 33 | 16 | 25 | 16 | 13 |
| 9420A61 | M20x1,5 | 26,5 | 20,2 | 42 | 19 | 32 | 22 | 15 |
| 9420A71 | M27x2 | 40,5 | 27,3 | 58 | 30 | 35 | 29 | 17 |

Ordering Key

| | |
|----------------------------|-----------|
| for sensor Type 9001A | 01 |
| for sensor Type 9011A | 11 |
| for sensor Type 9021A | 21 |
| for sensor Type 9031A/9039 | 31 |
| for sensor Type 9041A/9049 | 41 |
| for sensor Type 9051A | 51 |
| for sensor Type 9061A/9069 | 61 |
| for sensor Type 9071A | 71 |

Type 9420A

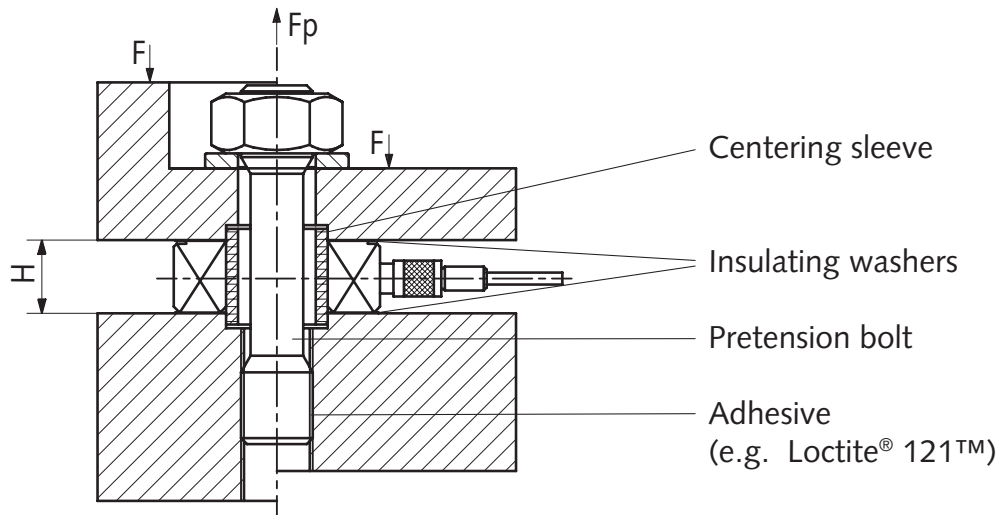


Fig. 6: Mounting example