



# Springs





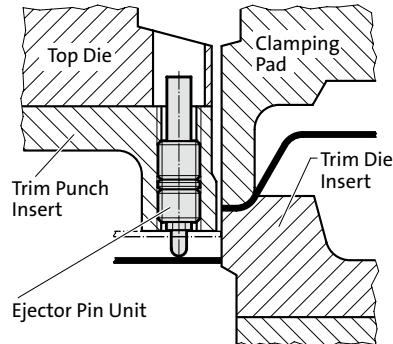
## Spring plungers



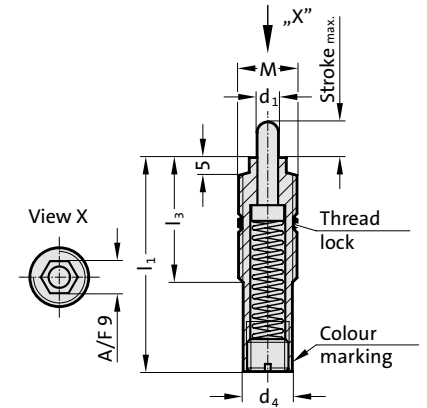
# Spring plunger, standard spring force, VDI 3004, Colour marking: yellow



Mounting example



2470.10. .1



## Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11). The spring-loaded pins are hardened.



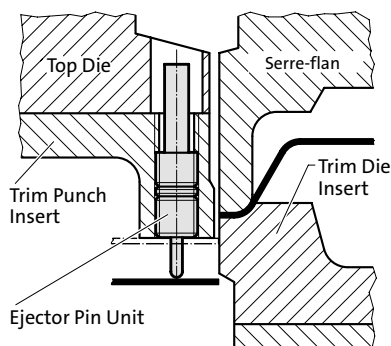
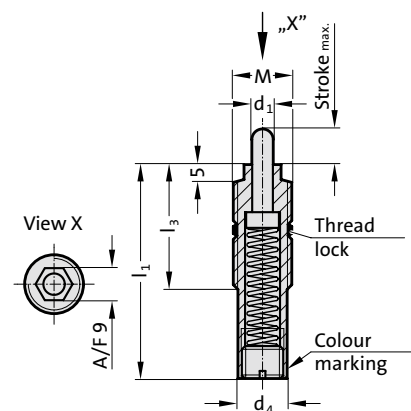
## 2470.10. .1 Spring plunger, standard spring force, VDI 3004, Colour marking: yellow

Order No	d <sub>1</sub>	d <sub>4</sub>	M	l <sub>1</sub>	l <sub>3</sub>	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final
2470.10.010.060.1	6	13.4	16x2	60	35	10	0.95	3.8	13.3
2470.10.010.016.060.1	6	13.4	16x1.5	60	35	10	0.95	3.8	13.3
2470.10.015.060.1	6	13.4	16x2	60	35	15	2	10	40
2470.10.015.016.060.1	6	13.4	16x1.5	60	35	15	2	10	40
2470.10.020.080.1	6	13.4	16x2	80	35	20	1.38	6.9	34.5
2470.10.020.016.080.1	6	13.4	16x1.5	80	35	20	1.38	6.9	34.5
2470.10.030.080.1	6	13.4	16x2	80	35	30	1.3	6.5	45.5
2470.10.030.016.080.1	6	13.4	16x1.5	80	35	30	1.3	6.5	45.5
2470.10.030.120.1	6	13.4	16x2	120	35	30	0.73	18	40
2470.10.030.016.120.1	6	13.4	16x1.5	120	35	30	0.73	18	40
2470.10.040.150.1	6	13.4	16x2	150	35	40	0.6	13.2	37.2
2470.10.040.016.150.1	6	13.4	16x1.5	150	35	40	0.6	13.2	37.2
2470.10.050.150.1	6	13.4	16x2	150	35	50	0.6	13.2	43.2
2470.10.050.016.150.1	6	13.4	16x1.5	150	35	50	0.6	13.2	43.2
2470.10.060.150.1	6	13.4	16x2	150	35	60	0.6	13.2	49.2
2470.10.060.016.150.1	6	13.4	16x1.5	150	35	60	0.6	13.2	49.2
2470.10.070.200.1	6	13.4	16x2	200	35	70	0.44	9.68	40.5
2470.10.070.016.200.1	6	13.4	16x1.5	200	35	70	0.44	9.68	40.5
2470.10.080.200.1	6	13.4	16x2	200	35	80	0.44	9.68	44.8
2470.10.080.016.200.1	6	13.4	16x1.5	200	35	80	0.44	9.68	44.8

## Spring plunger, standard spring force, VDI 3004, Colour marking: yellow

2470.10. .016. .1

Mounting example



### Description:

Spring ejectors are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11). The spring-loaded pins are hardened.



## 2470.10. .016. .1 Spring plunger, standard spring force, VDI 3004, Colour marking: yellow

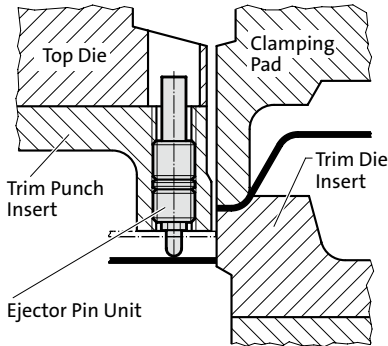
Order No	$d_1$	$d_4$	M	$l_1$	$l_3$	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final
2470.10.010.016.060.1	6	13.4	16x1.5	60	35	10	0.95	3.8	13.3
2470.10.015.016.060.1	6	13.4	16x1.5	60	35	15	2	10	40
2470.10.020.016.080.1	6	13.4	16x1.5	80	35	20	1.38	6.9	34.5
2470.10.030.016.080.1	6	13.4	16x1.5	80	35	30	1.3	6.5	45.5
2470.10.030.016.120.1	6	13.4	16x1.5	120	35	30	0.73	18	40
2470.10.040.016.150.1	6	13.4	16x1.5	150	35	40	0.6	13.2	37.2
2470.10.050.016.150.1	6	13.4	16x1.5	150	35	50	0.6	13.2	43.2
2470.10.060.016.150.1	6	13.4	16x1.5	150	35	60	0.6	13.2	49.2
2470.10.070.016.200.1	6	13.4	16x1.5	200	35	70	0.44	9.68	40.5
2470.10.080.016.200.1	6	13.4	16x1.5	200	35	80	0.44	9.68	44.8



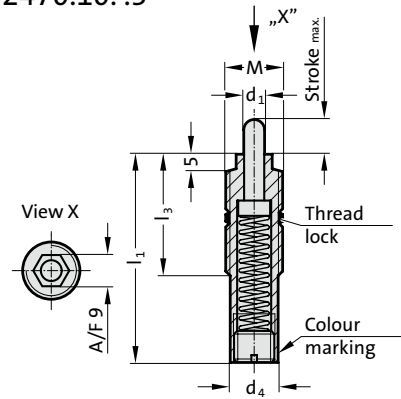
Spring plunger, medium spring force, VDI 3004, Colour marking: white



Mounting example



2470.10. .3



**Description:**

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11). The spring-loaded pins are hardened.



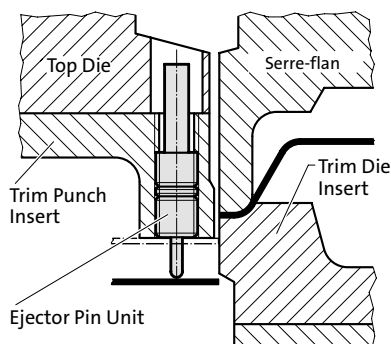
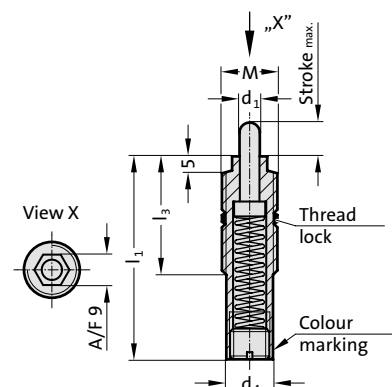
2470.10. .3 Spring plunger, medium spring force, VDI 3004, Colour marking: white

Order No	d <sub>1</sub>	d <sub>4</sub>	M	l <sub>1</sub>	l <sub>3</sub>	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final
2470.10.020.080.3	6	13.4	16x2	80	35	20	3.02	15.1	75.6
2470.10.020.016.080.3	6	13.4	16x1.5	80	35	20	3.02	15.1	75.6

## Spring plunger, medium spring force, VDI 3004, Colour marking: white

2470.10. .016. .3

### Mounting example



### Description:

Spring ejectors are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11). The spring-loaded pins are hardened.



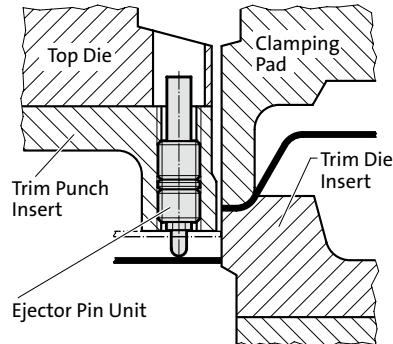
## 2470.10. .016. .3 Spring plunger, medium spring force, VDI 3004, Colour marking: white

Order No	$d_1$	$d_4$	$M$	$l_1$	$l_3$	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final
2470.10.020.016.080.3	6	13.4	16x1.5	80	35	20	3.02	15.1	75.6

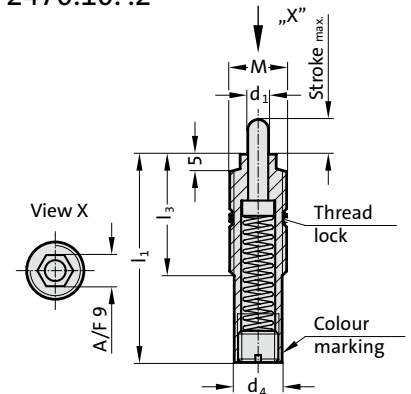
## Spring plunger, increased spring force, VDI 3004, Colour marking: red



Mounting example



2470.10..2



### Description:

Spring plungers are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11). The spring-loaded pins are hardened.



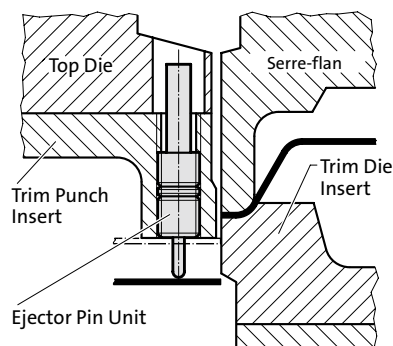
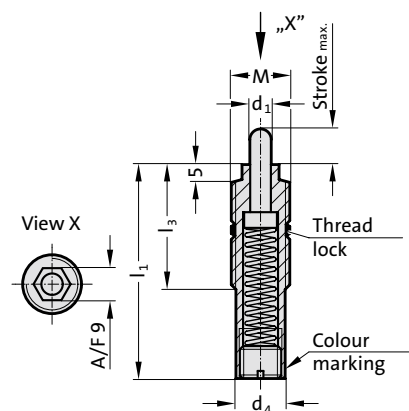
## 2470.10..2 Spring plunger, increased spring force, VDI 3004, Colour marking: red

Order No	d <sub>1</sub>	d <sub>4</sub>	M	l <sub>1</sub>	l <sub>3</sub>	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final
2470.10.010.060.2	6	13.4	16x2	60	35	10	3.25	13	45.5
2470.10.010.016.060.2	6	13.4	16x1.5	60	35	10	3.25	13	45.5
2470.10.015.060.2	6	13.4	16x2	60	35	15	2.6	15	56
2470.10.015.016.060.2	6	13.4	16x1.5	60	35	15	2.6	15	56
2470.10.020.080.2	6	13.4	16x2	80	35	20	6.9	34.5	172.5
2470.10.020.016.080.2	6	13.4	16x1.5	80	35	20	6.9	34.5	172.5
2470.10.030.120.2	6	13.4	16x2	120	35	30	2	20	80
2470.10.030.016.120.2	6	13.4	16x1.5	120	35	30	2	20	80
2470.10.030.150.2	6	13.4	16x2	150	35	30	2.55	56.1	132.6
2470.10.030.016.150.2	6	13.4	16x1.5	150	35	30	2.55	56.1	132.6
2470.10.040.150.2	6	13.4	16x2	150	35	40	2.55	56.1	158.1
2470.10.040.016.150.2	6	13.4	16x1.5	150	35	40	2.55	56.1	158.1
2470.10.050.200.2	6	13.4	16x2	200	35	50	1.61	19.3	99.9
2470.10.050.016.200.2	6	13.4	16x1.5	200	35	50	1.61	19.3	99.9
2470.10.060.200.2	6	13.4	16x2	200	35	60	1.61	19.3	116.1
2470.10.060.016.200.2	6	13.4	16x1.5	200	35	60	1.61	19.3	116.1
2470.10.070.200.2	6	13.4	16x2	200	35	70	1.61	19.3	132.1
2470.10.070.016.200.2	6	13.4	16x1.5	200	35	70	1.61	19.3	132.1
2470.10.080.200.2	6	13.4	16x2	200	35	80	0.94	25	100.1
2470.10.080.016.200.2	6	13.4	16x1.5	200	35	80	0.94	25	100.1

## Spring plunger, increased spring force, VDI 3004, Colour marking: red

2470.10..016..2

Mounting example



### Description:

Spring ejectors are used as ejectors, damper pins, fixing and retaining pins in many sectors of the tool-, jig- and fixture-making industries. Assembly requires the use of special FIBRO insertion tool (2470.10.11). The spring-loaded pins are hardened.



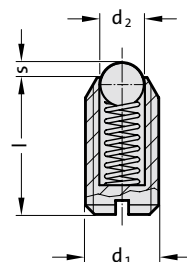
## 2470.10..016..2 Spring plunger, increased spring force, VDI 3004, Colour marking: red

Order No	d <sub>1</sub>	d <sub>4</sub>	M	l <sub>1</sub>	l <sub>3</sub>	Stroke max.	Spring rate [N/mm]	Spring force [N] initial	Spring force [N] final
2470.10.010.016.060.2	6	13.4	M16x1.5	60	35	10	3.25	13	45.5
2470.10.015.016.060.2	6	13.4	M16x1.5	60	35	15	2.6	15	56
2470.10.020.016.080.2	6	13.4	M16x1.5	80	35	20	6.9	34.5	172.5
2470.10.030.016.120.2	6	13.4	M16x1.5	120	35	30	2	20	80
2470.10.030.016.150.2	6	13.4	M16x1.5	150	35	30	2.55	56.1	132.6
2470.10.040.016.150.2	6	13.4	M16x1.5	150	35	40	2.55	56.1	158.1
2470.10.050.016.200.2	6	13.4	M16x1.5	200	35	50	1.61	19.3	99.9
2470.10.060.016.200.2	6	13.4	M16x1.5	200	35	60	1.61	19.3	116.1
2470.10.070.016.200.2	6	13.4	M16x1.5	200	35	70	1.61	19.3	132.1
2470.10.080.016.200.2	6	13.4	M16x1.5	200	35	80	0.94	25	100.1

## Spring plunger, with spring loaded ball, with slot, standard spring force



2471.01.



### Material:

Sleeve: Free machining steel, burnished

Ball: Hardened ball bearing steel

Spring: Nirosta

### Note:

For locking and for pressing upwards or downwards.

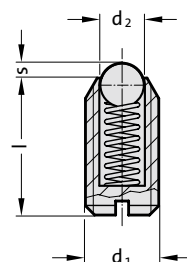
Temperature operating range: max. 250°C

### 2471.01. Spring plunger, with spring loaded ball, with slot, standard spring force

Order No	d <sub>1</sub>	l	s	d <sub>2</sub>	Spring force [N]	
					initial	final
2471.01.003	M3	7	0.4	1.5	3	4.5
2471.01.004	M4	9	0.8	2.5	8.5	14
2471.01.005	M5	12	0.9	3	8	14
2471.01.006	M6	14	1	3.5	11	18
2471.01.008	M8	16	1.5	4.5	18	31
2471.01.010	M10	19	2	6	24	45
2471.01.012	M12	22	2.5	8	26	49
2471.01.016	M16	24	3.5	10	41	86
2471.01.020	M20	30	4.5	12	56	111
2471.01.024	M24	34	5.5	15	81	151



2471.31.



### Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta, hardened

Spring: Nirosta

### Note:

For locking and for pressing upwards or downwards.

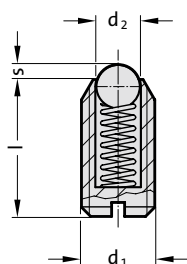
Admissible temperature range: max. 250°C

### 2471.31. Spring plunger, with spring loaded ball, with slot, standard spring force

Order No	d <sub>1</sub>	l	s	d <sub>2</sub>	Spring force [N]	
					initial	final
2471.31.003	M3	7	0.4	1.5	3	4.5
2471.31.004	M4	9	0.8	2.5	8.5	14
2471.31.005	M5	12	0.9	3	8	14
2471.31.006	M6	14	1	3.5	11	18
2471.31.008	M8	16	1.5	4.5	18	31
2471.31.010	M10	19	2	6	24	45
2471.31.012	M12	22	2.5	8	26	49
2471.31.016	M16	24	3.5	10	41	86
2471.31.020	M20	30	4.5	12	56	111
2471.31.024	M24	34	5.5	15	81	151

## Spring plunger, with spring loaded ball, with slot, increased spring force

2471.02.



### 2471.02. Spring plunger, with spring loaded ball, with slot, increased spring force

Order No	d <sub>1</sub>	l	s	d <sub>2</sub>	Spring force [N]	
					initial	final
2471.02.005	M5	12	0.9	3	15	22
2471.02.006	M6	14	1	3.5	19	28
2471.02.008	M8	16	1.5	4.5	36	62
2471.02.010	M10	19	2	6	57	104
2471.02.012	M12	22	2.5	8	61	110
2471.02.016	M16	24	3.5	10	68	142
2471.02.020	M20	30	4.5	12	84	166
2471.02.024	M24	34	5.5	15	127	237

#### Material:

Sleeve: Free machining steel, burnished

Ball: Hardened ball bearing steel

Spring: Nirosta

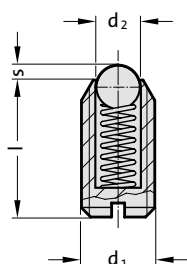
#### Note:

For locking and for pressing upwards or downwards.

Admissible temperature range: max. 250°C

Identification of increased spring force by two longitudinal marks on the sleeve.

2471.32.



### 2471.32. Spring plunger, with spring loaded ball, with slot, increased spring force

Order No	d <sub>1</sub>	l	s	d <sub>2</sub>	Spring force [N]	
					initial	final
2471.32.005	M5	12	0.9	3	15	22
2471.32.006	M6	14	1	3.5	19	28
2471.32.008	M8	16	1.5	4.5	36	62
2471.32.010	M10	19	2	6	57	104
2471.32.012	M12	22	2.5	8	61	110
2471.32.016	M16	24	3.5	10	68	142
2471.32.020	M20	30	4.5	12	84	166
2471.32.024	M24	34	5.5	15	127	237

#### Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta, hardened

Spring: Nirosta

#### Note:

For locking and for pressing upwards or downwards.

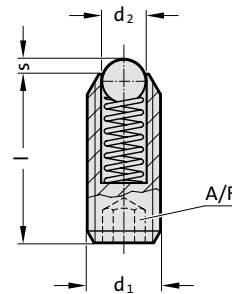
Admissible temperature range: max. 250°C.

Identification of increased spring force by two longitudinal marks on the sleeve.

## Spring plunger, with spring loaded ball, with hexagon socket, standard spring force



2471.03.



### Material:

Sleeve: Free machining steel, burnished

Ball: Hardened ball bearing steel

Spring: Nirosta

### Note:

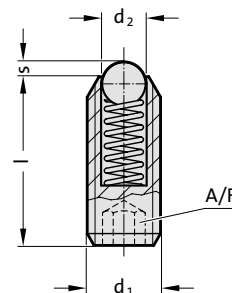
For locking and for pressing upwards or downwards.  
Temperature operating range: max. 250°C

### 2471.03. Spring plunger, with spring loaded ball, with hexagon socket, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	A/F	l	s	Spring force [N]	Spring force [N]
						initial	final
2471.03.003	M3	1.5	1.5	8	0.4	3	4.5
2471.03.004	M4	2.5	2	12	0.8	8.5	14
2471.03.005	M5	3	2.5	14	0.9	8	14
2471.03.006	M6	3.5	3	15	1	11	18
2471.03.008	M8	4.5	4	18	1.5	18	31
2471.03.010	M10	6	5	23	2	24	45
2471.03.012	M12	8	6	26	2.5	26	49
2471.03.016	M16	10	8	33	3.5	41	86
2471.03.020	M20	12	10	43	4.5	56	111
2471.03.024	M24	15	12	48	5.5	81	151



2471.33.



### Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta, hardened

Spring: Nirosta

### Note:

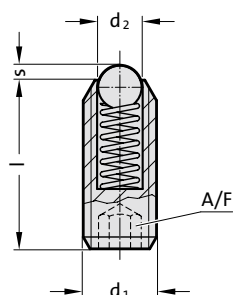
For locking and for pressing upwards or downwards.  
Admissible temperature range: max. 250°C

### 2471.33. Spring plunger, with spring loaded ball, with hexagon socket, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	A/F	l	s	Spring force [N]	Spring force [N]
						initial	final
2471.33.003	M3	1.5	1.5	8	0.4	3	4.5
2471.33.004	M4	2.5	2	12	0.8	8.5	14
2471.33.005	M5	3	2.5	14	0.9	8	14
2471.33.006	M6	3.5	3	15	1	11	18
2471.33.008	M8	4.5	4	18	1.5	18	31
2471.33.010	M10	6	5	23	2	24	45
2471.33.012	M12	8	6	26	2.5	26	49
2471.33.016	M16	10	8	33	3.5	41	86
2471.33.020	M20	12	10	43	4.5	56	111
2471.33.024	M24	15	12	48	5.5	81	151

# Spring plunger, with spring loaded ball, with hexagon socket, increased spring force

2471.04.



**2471.04. Spring plunger, with spring loaded ball, with hexagon socket, increased spring force**

Order No	d <sub>1</sub>	d <sub>2</sub>	A/F	l	s	Spring force [N]	
						initial	final
2471.04.005	M5	3	2.5	14	0.9	15	22
2471.04.006	M6	3.5	3	15	1	19	28
2471.04.008	M8	4.5	4	18	1.5	36	62
2471.04.010	M10	6	5	23	2	57	104
2471.04.012	M12	8	6	26	2.5	61	110
2471.04.016	M16	10	8	33	3.5	68	142
2471.04.020	M20	12	10	43	4.5	84	166
2471.04.024	M24	15	12	48	5.5	127	237

## Material:

Sleeve: Free machining steel, burnished

Ball: Hardened ball bearing steel

Spring: Nirosta

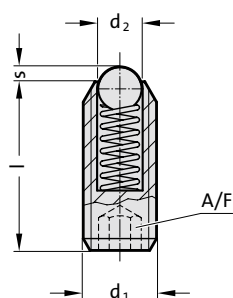
## Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

Identification of increased spring force by two longitudinal marks on the sleeve.

2471.34.



**2471.34. Spring plunger, with spring loaded ball, with hexagon socket, increased spring force**

Order No	d <sub>1</sub>	d <sub>2</sub>	A/F	l	s	Spring force [N]	
						initial	final
2471.34.005	M5	3	2.5	14	0.9	15	22
2471.34.006	M6	3.5	3	15	1	19	28
2471.34.008	M8	4.5	4	18	1.5	36	62
2471.34.010	M10	6	5	23	2	57	104
2471.34.012	M12	8	6	26	2.5	61	110
2471.34.016	M16	10	8	33	3.5	68	142
2471.34.020	M20	12	10	43	4.5	84	166
2471.34.024	M24	15	12	48	5.5	127	237

## Material:

Sleeve: Nirosta 1.4305

Ball: Nirosta, hardened

Spring: Nirosta

## Note:

For locking and for pressing upwards or downwards.

Admissible temperature range: max. 250°C.

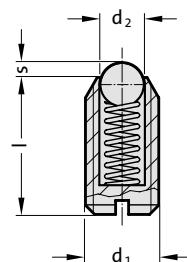
Identification of increased spring force by two longitudinal marks on the sleeve.



## Spring plunger, with spring loaded ball, with slot, standard spring force



2471.05.



### Material:

Sleeve: Delrin blue (POM)

Ball: Delrin white (POM)

Spring: Nirosta

### Note:

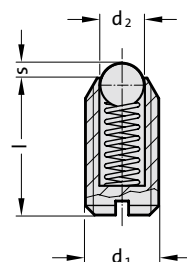
For locking and for pressing upwards or downwards.  
Temperature operating range: -30°C to +50°C

### 2471.05. Spring plunger, with spring loaded ball, with slot, standard spring force

Order No	d <sub>1</sub>	l	s	d <sub>2</sub>	Spring force [N]	
					initial	final
2471.05.006	M6	14	0.9	3.5	12	17
2471.05.008	M8	16	1.5	5	20	35
2471.05.010	M10	19	1.9	6	25	45



2471.35.



### Material:

Sleeve: Delrin blue (POM)

Ball: Nirosta, hardened

Spring: Nirosta

### Note:

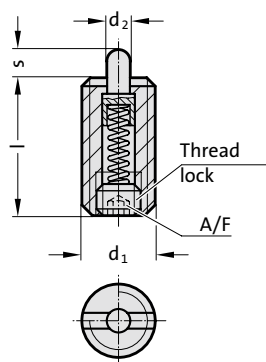
For locking and for pressing upwards or downwards.  
Admissible temperature range: -30°C to +50°C.

### 2471.35. Spring plunger, with spring loaded ball, with slot, standard spring force

Order No	d <sub>1</sub>	l	s	d <sub>2</sub>	Spring force [N]	
					initial	final
2471.35.006	M6	14	0.9	3.5	12	17
2471.35.008	M8	16	1.5	5	20	35
2471.35.010	M10	19	1.9	6	25	45

## Spring plunger, with spring loaded pin, with slot, standard spring force

2472.01.



2472.01. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	A/F	Spring force [N]	
						initial	final
2472.01.003	M3	1	12	1	0.7	2	4
2472.01.004	M4	1.5	15	1.5	1.3	4.5	16
2472.01.005	M5	2.4	18	2.3	1.5	6	19
2472.01.006	M6	2.7	20	2.5	2	6	19
2472.01.008	M8	3.5	22	3	2.5	10	39
2472.01.010	M10	4	22	3	3	10	39
2472.01.012	M12	6	28	4	4	12	53
2472.01.016	M16	7.5	32	5	5	45	100
2472.01.020	M20	10	40	7	6	52	125
2472.01.024	M24	12	52	10	8	70	170

**Material:**

Sleeve: Free machining steel, burnished

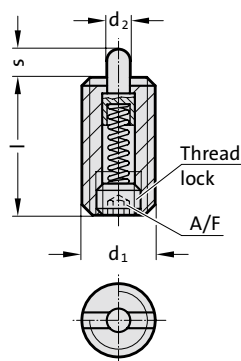
Pin: Free machining steel hardened, burnished

Spring: Nirosta

**Note:**

For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

2472.31.



2472.31. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	A/F	Spring force [N]	
						initial	final
2472.31.004	M4	1.5	15	1.5	1.3	4.5	16
2472.31.005	M5	2.4	18	2.3	1.5	6	19
2472.31.006	M6	2.7	20	2.5	2	6	19
2472.31.008	M8	3.5	22	3	2.5	10	39
2472.31.010	M10	4	22	3	3	10	39
2472.31.012	M12	6	28	4	4	12	53
2472.31.016	M16	7.5	32	5	5	45	100
2472.31.020	M20	10	40	7	6	52	125

**Material:**

Sleeve: Nirosta 1.4305

Pin: Nirosta 1.4305

Spring: Nirosta

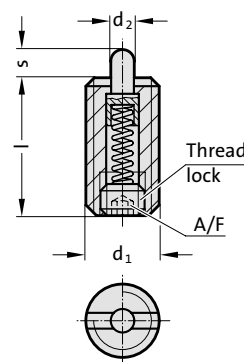
**Note:**

For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

## Spring plunger, with spring loaded pin, with slot, standard spring force



2472.21.



### Material:

Sleeve: Free machining steel, burnished

Pin: Delrin white (POM)

Spring: Nirosta

### Note:

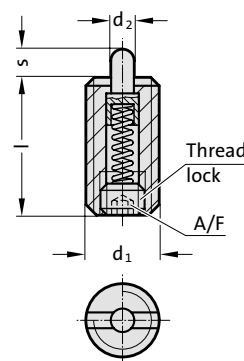
For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

### 2472.21. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	A/F	Spring force [N]	
						initial	final
2472.21.004	M4	1.5	15	1.5	1.3	4.5	16
2472.21.005	M5	2.4	18	2.3	1.5	6	19
2472.21.006	M6	2.7	20	2.5	2	6	19
2472.21.008	M8	3.5	22	3	2.5	10	39
2472.21.010	M10	4	22	3	3	10	39
2472.21.012	M12	6	28	4	4	12	53
2472.21.016	M16	7.5	32	5	5	45	100



2472.22.



### Material:

Sleeve: Nirosta 1.4305

Pin: Delrin white (POM)

Spring: Nirosta

### Note:

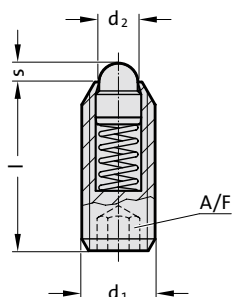
For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

### 2472.22. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	A/F	Spring force [N]	
						initial	final
2472.22.004	M4	1.5	15	1.5	1.3	4.5	16
2472.22.005	M5	2.4	18	2.3	1.5	6	19
2472.22.006	M6	2.7	20	2.5	2	6	19
2472.22.008	M8	3.5	22	3	2.5	10	39
2472.22.010	M10	4	22	3	3	10	39
2472.22.012	M12	6	28	4	4	12	53
2472.22.016	M16	7.5	32	5	5	45	100

## Spring plunger, with spring loaded pin, with hexagon socket, standard spring force

2472.03.



### 2472.03. Spring plunger, with spring loaded pin, with hexagon socket, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	A/F	Spring force [N]	
						initial	final
2472.03.004	M4	1.8	12	1.5	2	4.5	12.5
2472.03.005	M5	2.4	14	2	2.5	5	13
2472.03.006	M6	2.7	15	2	3	6	17
2472.03.008	M8	3.8	18	2	4	16	33
2472.03.010	M10	4.5	23	2.5	5	19	42
2472.03.012	M12	6	26	3.5	6	22	57
2472.03.016	M16	8.5	33	4.5	8	38	78
2472.03.020	M20	10	43	6.5	10	39	81
2472.03.024	M24	13	48	8	12	72	155

#### Material:

Sleeve: Free machining steel, burnished

Pin: Free machining steel hardened, burnished

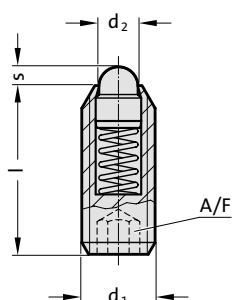
Spring: Nirosta

#### Note:

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

2472.33.



### 2472.33. Spring plunger, with spring loaded pin, with hexagon socket, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	A/F	Spring force [N]	
						initial	final
2472.33.004	M4	1.8	12	1.5	2	4.5	12.5
2472.33.005	M5	2.4	14	2	2.5	5	13
2472.33.006	M6	2.7	15	2	3	6	17
2472.33.008	M8	3.8	18	2	4	16	33
2472.33.010	M10	4.5	23	2.5	5	19	42
2472.33.012	M12	6	26	3.5	6	22	57
2472.33.016	M16	8.5	33	4.5	8	38	78
2472.33.020	M20	10	43	6.5	10	39	81
2472.33.024	M24	13	48	8	12	72	155

#### Material:

Sleeve: Nirosta 1.4305

Pin: Nirosta 1.4305

Spring: Nirosta

#### Hinweis:

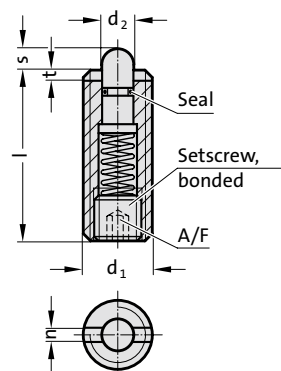
For locking and for pressing upwards or downwards.

Admissible temperature range: max. 250°C

## Spring plunger, with spring loaded pin and seal, with hexagon socket, standard spring force



2472.07.



### Material:

Sleeve: Free machining steel, burnished

Pin: Free machining steel hardened, burnished

Spring: Nirosta

### Note:

For locking and for pressing upwards or downwards. The seal prevents the ingress of liquids into the forcing pin. Assembly and dismantling using hexagon socket key and slotted screwdriver.

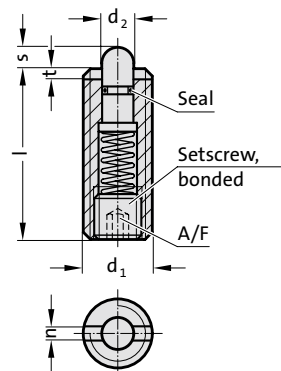
Temperature operating range: -30°C up to 80°C

### 2472.07. Spring plunger, with spring loaded pin and seal, with hexagon socket, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	n	s	t	A/F	Spring force [N]	
								initial	final
2472.07.008	M8	3.8	26	1.5	3	1.4	2.5	9	24
2472.07.010	M10	4	28	1.5	3	5.1	4	15	30
2472.07.012	M12	6	35	2.7	4	2	4	24	50
2472.07.016	M16	7.5	40	3.2	5	2.5	5	36	58



2472.37.



### Material:

Sleeve: Nirosta 1.4305

Pin: Nirosta 1.4305

Spring: Nirosta

### Note:

For locking and for pressing upwards or downwards. The seal prevents the ingress of liquids into the forcing pin. Assembly and dismantling using hexagon socket key and slotted screwdriver.

Temperature operating range: -30°C up to 80°C

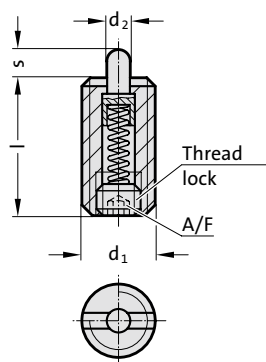
### 2472.37. Spring plunger, with spring loaded pin and seal, with hexagon socket, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	n	s	t	A/F	Spring force [N]	
								initial	final
2472.37.008	M8	3.8	26	1.5	3	1.4	2.5	9	24
2472.37.010	M10	4	28	1.5	3	5.1	4	15	30
2472.37.012	M12	6	35	2.7	4	2	4	24	50
2472.37.016	M16	7.5	40	3.2	5	2.5	5	36	58

## Spring plunger, with spring loaded pin, with slot, increased spring force

### Spring plunger, with spring loaded pin and seal, with hexagon socket, increased spring force

2472.02.



### 2472.02. Spring plunger, with spring loaded pin, with slot, increased spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	A/F	l	s	Spring force [N]	
						initial	final
2472.02.005	M5	2.4	1.5	18	2.3	11	40
2472.02.006	M6	2.7	2	20	2.5	15	43
2472.02.008	M8	3.5	2.5	22	3	20	75
2472.02.010	M10	4	3	22	3	20	75
2472.02.012	M12	6	4	28	4	45	120
2472.02.016	M16	7.5	5	32	5	64	160
2472.02.020	M20	10	6	40	7	75	195
2472.02.024	M24	12	8	52	10	75	245

#### Material:

Sleeve: Free machining steel, burnished

Pin: Free machining steel hardened, burnished

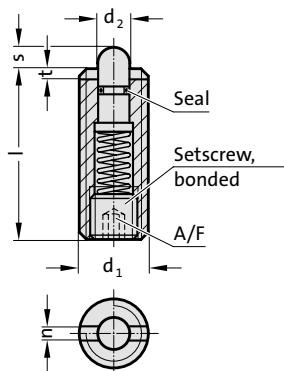
Spring: Nirosta

#### Note:

For locking and for pressing upwards or downwards. Removable with hexagon socket screw key or slotted screwdriver.

Identification of increased spring force by two longitudinal marks on the sleeve.

2472.08.



### 2472.08. Spring plunger, with spring loaded pin and seal, with hexagon socket, increased spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	n	s	t	A/F	Spring force [N]	
								initial	final
2472.08.008	M8	3.8	26	1.5	3	1.4	2.5	17	39
2472.08.010	M10	4	28	1.5	3.5	1.4	3	22	43
2472.08.012	M12	6	35	2.7	4	2	4	40	80
2472.08.016	M16	7.5	40	3.2	5	2.5	5	44	113

#### Material:

Sleeve: Free machining steel, burnished

Pin: Free machining steel hardened, burnished

Spring: Nirosta

#### Note:

For locking and for pressing upwards or downwards. The seal prevents the ingress of liquids into the forcing pin. Assembly and dismantling using hexagon socket key and slotted screwdriver.

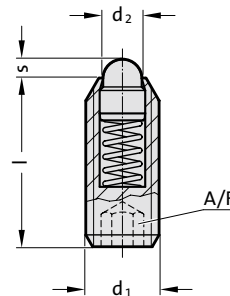
Temperature operating range: -30°C up to 80°C

Identification of increased spring force by two longitudinal marks on the sleeve.

## Spring plunger, with spring loaded pin, with hexagon socket, increased spring force



2472.04.



### Material:

Sleeve: Free machining steel, burnished  
Pin: Free machining steel hardened, burnished  
Spring: Nirosta

### Note:

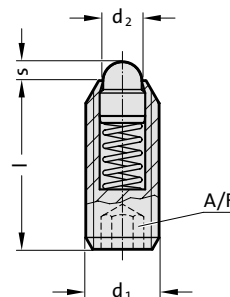
For locking and for pressing upwards or downwards.  
Temperature operating range: max. 250°C  
Identification of increased spring force by two longitudinal marks on the sleeve.

### 2472.04. Spring plunger, with spring loaded pin, with hexagon socket, increased spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	A/F	Spring force [N]	
						initial	final
2472.04.006	M6	2.7	15	2	3	11	25
2472.04.008	M8	3.8	18	2	4	23	59
2472.04.010	M10	4.5	23	2.5	5	20	54
2472.04.012	M12	6	26	3.5	6	38	96
2472.04.016	M16	8.5	33	4.5	8	50	100
2472.04.020	M20	10	43	6.5	10	52	133
2472.04.024	M24	13	48	8	12	91	223



2472.34.



### Material:

Sleeve: Nirosta 1.4305  
Pin: Nirosta 1.4305  
Spring: Nirosta

### Note:

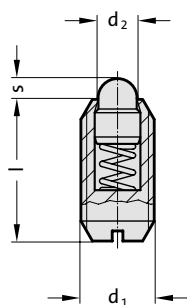
For locking and for pressing upwards or downwards.  
Temperature operating range: max. 250°C  
Identification of increased spring force by two longitudinal marks on the sleeve.

### 2472.34. Spring plunger, with spring loaded pin, with hexagon socket, increased spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	A/F	Spring force [N]	
						initial	final
2472.34.006	M6	2.7	15	2	3	11	25
2472.34.008	M8	3.8	18	2	4	23	59
2472.34.010	M10	4.5	23	2.5	5	20	54
2472.34.012	M12	6	26	3.5	6	38	96
2472.34.016	M16	8.5	33	4.5	8	50	100
2472.34.020	M20	10	43	6.5	10	52	133
2472.34.024	M24	13	48	8	12	91	223

## Spring plunger, with spring loaded pin, with slot, standard spring force

2472.05.



2472.05. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	Spring force [N]	Spring force [N]
					initial	final
2472.05.004	4	1.8	9	1.5	4.5	12.5
2472.05.005	5	2.4	12	2	5	13
2472.05.006	6	2.7	14	2	6	17
2472.05.008	8	3.8	16	2	16	33
2472.05.010	10	4.5	19	2.5	19	42
2472.05.012	12	6.2	22	3.5	22	57
2472.05.016	16	8.5	24	4.5	38	78
2472.05.020	20	10	30	6.5	39	81
2472.05.024	24	13	34	8	72	155

**Material:**

Sleeve: Free machining steel, burnished

Pin: Free machining steel hardened, burnished

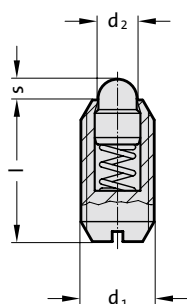
Spring: Nirosta

**Note:**

For locking and for pressing upwards or downwards.

Temperature operating range: max. 250°C

2472.35.



2472.35. Spring plunger, with spring loaded pin, with slot, standard spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	Spring force [N]	Spring force [N]
					initial	final
2472.35.004	4	1.8	9	1.5	4.5	12.5
2472.35.005	5	2.4	12	2	5	13
2472.35.006	6	2.7	14	2	6	17
2472.35.008	8	3.8	16	2	16	33
2472.35.010	10	4.5	19	2.5	19	42
2472.35.012	12	6.2	22	3.5	22	57
2472.35.016	16	8.5	24	4.5	38	78
2472.35.020	20	10	30	6.5	39	81
2472.35.024	24	13	34	8	72	155

**Material:**

Sleeve: Nirosta 1.4305

Pin: Nirosta 1.4305

Spring: Nirosta

**Note:**

For locking and for pressing upwards or downwards.

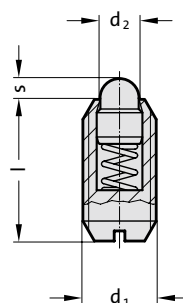
Temperature operating range: max. 250°C



## Spring plunger, with spring loaded pin, with slot, increased spring force



2472.06.



### Material:

Sleeve: Free machining steel, burnished  
Pin: Free machining steel hardened, burnished  
Spring: Nirosta

### Note:

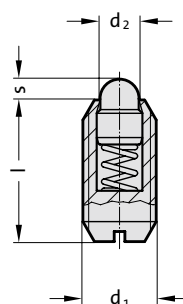
For locking and for pressing upwards or downwards.  
Temperature operating range: max. 250°C  
Identification of increased spring force by two longitudinal marks on the sleeve.

### 2472.06. Spring plunger, with spring loaded pin, with slot, increased spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	Spring force [N]	
					initial	final
2472.06.006	M6	2.7	14	2	11	25
2472.06.008	M8	3.8	16	2	23	59
2472.06.010	M10	4.5	19	2.5	20	54
2472.06.012	M12	6.2	22	3.5	38	96
2472.06.016	M16	8.5	24	4.5	50	100
2472.06.020	M20	10	30	6.5	52	133
2472.06.024	M24	13	34	8	91	223



2472.36.



### Material:

Sleeve: Nirosta 1.4305  
Pin: Nirosta 1.4305  
Spring: Nirosta

### Note:

For locking and for pressing upwards or downwards.  
Temperature operating range: max. 250°C  
Identification of increased spring force by two longitudinal marks on the sleeve.

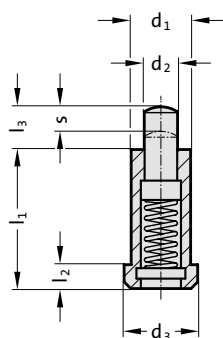
### 2472.36. Spring plunger, with spring loaded pin, with slot, increased spring force

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	Spring force [N]	
					initial	final
2472.36.006	M6	2.7	14	2	11	25
2472.36.008	M8	3.8	16	2	23	59
2472.36.010	M10	4.5	19	2.5	20	54
2472.36.012	M12	6.2	22	3.5	38	96
2472.36.016	M16	8.5	24	4.5	50	100
2472.36.020	M20	10	30	6.5	52	133
2472.36.024	M24	13	34	8	91	223

# Spring plunger, with spring loaded pin, straight version, with collar

## Spring plunger, with spring loaded ball, straight version

2473.01.



2473.01. Spring plunger, with spring loaded pin, straight version, with collar

Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	s	Spring force [N]	
								initial	final
2473.01.006	6	2.7	8	20	3.2	6	3.5	10	22
2473.01.008	8	3.9	10	24	3.2	8	4.5	30	88
2473.01.010	10	5.9	13	30	4	10	5.5	42	110
2473.01.012	12	7.9	16	36	5	12	6.5	50	130

**Material:**

Sleeve: Free machining steel, burnished

Pin: Steel, case hardened, burnished

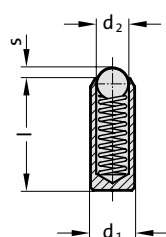
Spring: Nirosta

**Note:**

For use in toolmaking as forcing pins and spring loaded limit stops. Neither the threaded cartridge nor any of its components can escape from the mounting.

Temperature operating range: max. 250 °C

2473.02.



2473.02. Spring plunger, with spring loaded ball, straight version

Order No	d <sub>1</sub>	d <sub>2</sub>	l	s	Spring force [N]	
					initial	final
2473.02.030	3	2	7	0.65	4.5	7.5
2473.02.035	3.5	2.5	9	0.8	6	14.5
2473.02.040	4	3	11	0.9	8	14
2473.02.045	4.5	3.2	12	0.95	9.5	16.5
2473.02.050	5	3.5	13	1	11	18
2473.02.055	5.5	4	14	1.2	15.5	25
2473.02.060	6	4.5	15	1.5	18	31

**Material:**

Sleeve: Nirosta 1.4305

Pin: Nirosta hardened

Spring: Nirosta

**Note:**

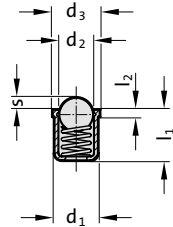
For locking and for pressing upwards or downwards.

Temperature operating range: max. 250 °C

# Spring plunger, with spring loaded ball, straight version, with collar



2475.01.



## Material:

Sleeve: Delrin blue (POM)  
Ball: Delrin white (POM)  
Spring: Nirosta

## Note:

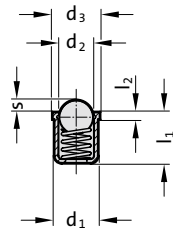
For locking and for pressing upwards or downwards.  
Temperature operating range: -30°C to +50°C

## 2475.01. Spring plunger, with spring loaded ball, straight version, with collar

Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	s	Spring force [N]	
							initial	final
2475.01.004	4	3	4.6	5	1	0.8	2.5	6.5
2475.01.005	5	4	5.6	6	1	1	6	9.4
2475.01.006	6	5	6.5	7	1	1.6	6.5	13
2475.01.008	8	6.5	8.5	9	1	1.9	8	18
2475.01.010	10	8	11	13.5	1.5	2.4	12	23
2475.01.012	12	10	13	16	1.5	3.3	13	25



2475.02.



## Material:

Sleeve: Delrin blue (POM)  
Ball: Nirosta, hardened  
Spring: Nirosta

## Note:

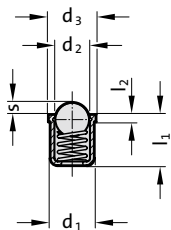
For locking and for pressing upwards or downwards.  
Temperature operating range: -30°C to +50°C

## 2475.02. Spring plunger, with spring loaded ball, straight version, with collar

Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	s	Spring force [N]	
							initial	final
2475.02.004	4	3	4.6	5	1	0.8	2.5	6.5
2475.02.005	5	4	5.6	6	1	1	6	9.4
2475.02.006	6	5	6.5	7	1	1.6	6.5	13
2475.02.008	8	6.5	8.5	9	1	1.9	8	18
2475.02.010	10	8	11	13.5	1.5	2.4	12	23
2475.02.012	12	10	13	16	1.5	3.3	13	25

## Spring plunger, with spring loaded ball, straight version, with collar

2475.03.



### 2475.03. Spring plunger, with spring loaded ball, straight version, with collar

Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	s	Spring force [N]	Spring force [N]
							initial	final
2475.03.004	4	3	4.5	5	1	0.8	3	6
2475.03.005	5	4	5.5	6	1	1	4	6.5
2475.03.006	6	5	6.5	7	1	1.6	6	11.5
2475.03.008	8	6.5	8.5	9	1	1.9	8	12.5

#### Material:

Sleeve: Brass

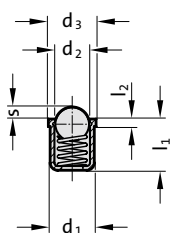
Ball: Nirosta, hardened

Spring: Nirosta

#### Note:

For locking and for pressing upwards or downwards.  
Temperature operating range: max. 250°C

2475.04.



### 2475.04. Spring plunger, with spring loaded ball, straight version, with collar

Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	s	Spring force [N]	Spring force [N]
							initial	final
2475.04.004	4	3	4.6	5	0.9	1	2.5	6
2475.04.005	5	4	5.6	6	0.9	1.4	3	6.5
2475.04.006	6	5	6.5	7	1	1.8	5.5	11.5
2475.04.008	8	6.5	8.5	9	1.1	2.4	7	12.5
2475.04.010	10	8.5	11	13.5	1.7	3.3	8.5	18.5
2475.04.012	12	10	13	16	2.3	4	12	26.5

#### Material:

Sleeve: Nirosta 1.4303

Ball: Nirosta, hardened

Spring: Nirosta

#### Note:

For locking and for pressing upwards or downwards.  
Temperature operating range: max. 250°C

# Accessories for Spring Plungers



**2470.10.11**  
**Insertion Tool**  
 for 2470.10.



**2470.12.010.017**  
**Insertion Tool**  
 for 2479. and 3479.



**2472.11.003 up to 2472.11.020**  
**Thrust pad driver**  
 for 2472.01./..02.

Order No	for thread
2472.11.003	M 3
2472.11.004	M 4
2472.11.005	M 5
2472.11.006	M 6
2472.11.008	M 8
2472.11.010	M 10
2472.11.012	M 12
2472.11.016	M 16
2472.11.020	M 20



**2472.11.024**  
**Thrust pad driver**  
 for 2472.01./..02.

Order No	for thread
2472.11.024	M 24



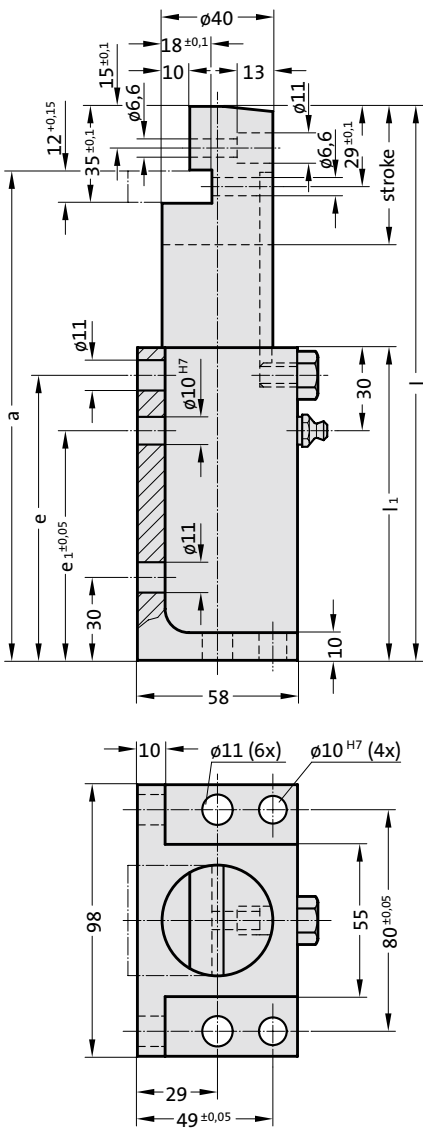
**Stripping unit,  
Stock lifter,  
Lifting unit,  
Spring ram**



## Stripping unit, wall and bottom mounting



2477..1.01



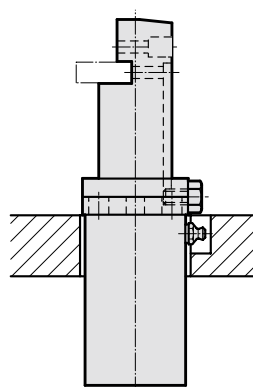
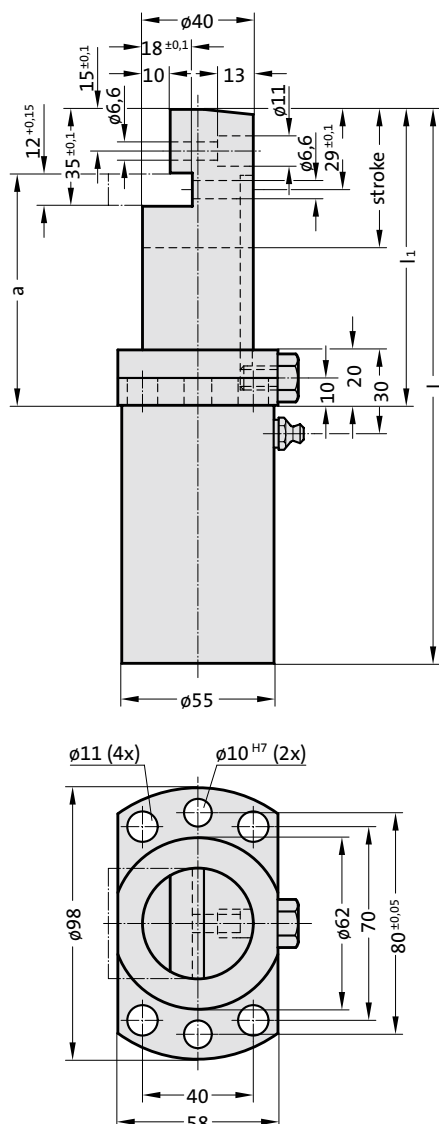
2477..1.01 Stripping unit, wall and bottom mounting

Order No	Stroke	Initial spring force [daN]	l	l <sub>1</sub>	a	e	e <sub>1</sub>
2477.050.00050.1.01	50	50	200	113	177	103	83
2477.050.00100.1.01	50	100	200	113	177	103	83
2477.050.00150.1.01	50	150	200	113	177	103	83
2477.050.00200.1.01	50	200	200	113	177	103	83
2477.080.00050.1.01	80	50	260	143	237	133	113
2477.080.00100.1.01	80	100	260	143	237	133	113
2477.080.00150.1.01	80	150	260	143	237	133	113
2477.080.00200.1.01	80	200	260	143	237	133	113



## Stripping unit, flanged mounting

2477..1.02



## 2477..1.02 Stripping unit, flanged mounting

Order No	Stroke	Initial spring force [daN]	l	l <sub>1</sub>	a
2477.050.00050.1.02	50	50	200	107	84
2477.050.00100.1.02	50	100	200	107	84
2477.050.00150.1.02	50	150	200	107	84
2477.050.00200.1.02	50	200	200	107	84
2477.080.00050.1.02	80	50	260	137	114
2477.080.00100.1.02	80	100	260	137	114
2477.080.00150.1.02	80	150	260	137	114
2477.080.00200.1.02	80	200	260	137	114



## Stock lifter



**2478.10.**  
**Stock lifter**

Order No*	Stroke <sub>max.</sub>	l <sub>min.</sub>	l
2478.10.□□□□□.025	25	121	146
2478.10.□□□□□.050	50	146	196
2478.10.□□□□□.080	80	176	256
2478.10.□□□□□.100	100	196	296
2478.10.□□□□□.125	125	221	346
2478.10.□□□□□.150	150	246	396

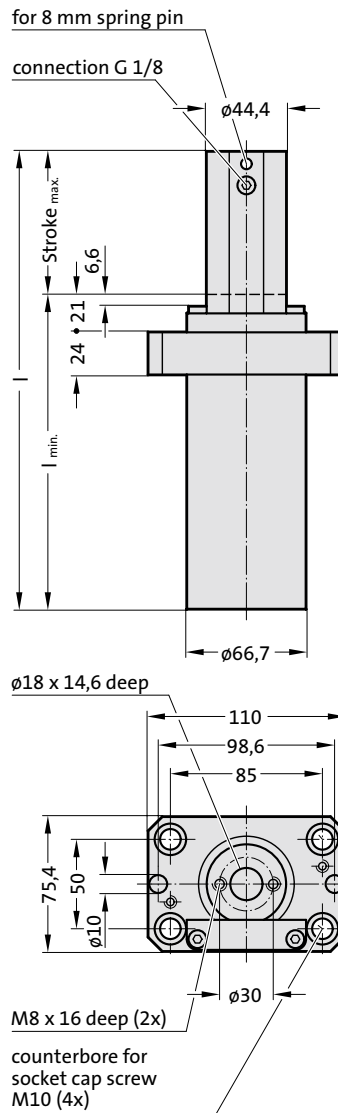
\*complete with initial spring force

### Spring force marking:

Initial spring force [daN] - Pressure [bar]

.00050. - 28  
.00100. - 56  
.00150. - 84  
.00200. - 113  
.00250. - 141  
.00320. - 180

### 2478.10.

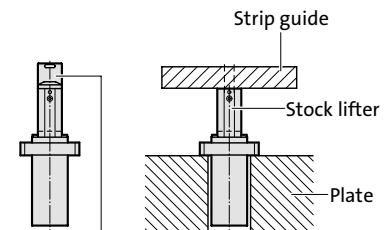


### Description:

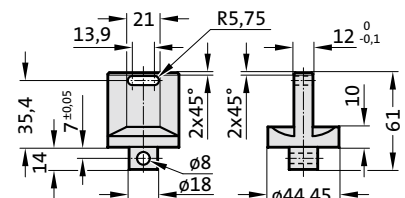
All component lifters in the various gas spring classes are of the same design and the different spring forces are achieved solely by means of different gas pressures. The pressure can be topped up or reduced via the piston rod.

### Note:

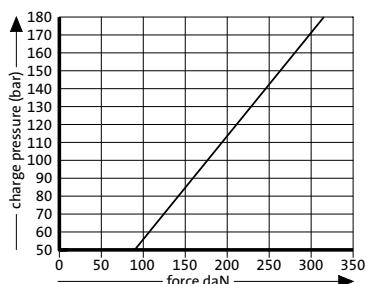
Pressure medium: Nitrogen - N<sub>2</sub>  
Max. filling pressure: 180 bar  
Min. filling pressure: 25 bar  
Working temperature: 0°C bis +80°C  
Temperature related force increase: ± 0,3%/°C  
Max. recommended extensions per minute: approx. ca. 80-100 (at 20°C)  
Max. piston speed: 1,6 m/s  
Order No for spare parts kit: 2478.10.00320  
Spring forces as per spring diagram.  
Upon customers request, also available unfilled, Order No 2478.10.00000....



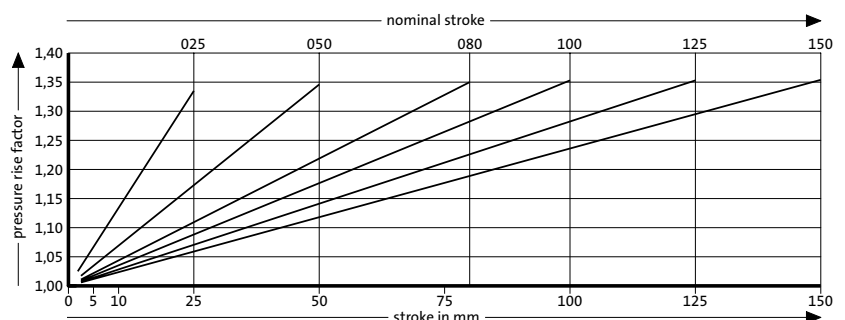
2478.10.00320.01 Fixing adapter  
order separately



Initial spring force  
versus charge pressure



Spring force Diagram displacement versus stroke rise



Pressure rise factor accounts for displacement but not external influences!



## Stock lifter

### Description:

The cylinder base can be used for topping up and reducing gas pressure and for interconnection arrangements.

### Note:

Stocklifters are equipped with a "PowerLine" 2487.12.00170. gas spring with no option for wear compensation, so complete replacement is required.

Pressure medium: Nitrogen – N<sub>2</sub>

Max. filling pressure: 180 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

Temperature related force increase:  $\pm 0,3\%/^{\circ}\text{C}$

Max. recommended extensions per minute:

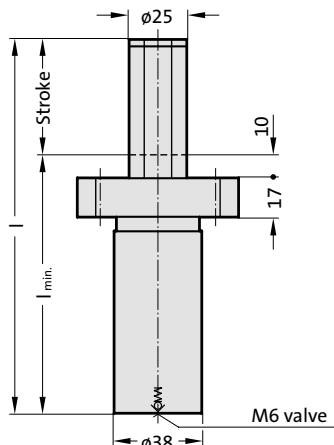
approx. 40 to 100 (at 20°C)

Max. piston speed: 1,6 m/s

Max. effective travel: 100%

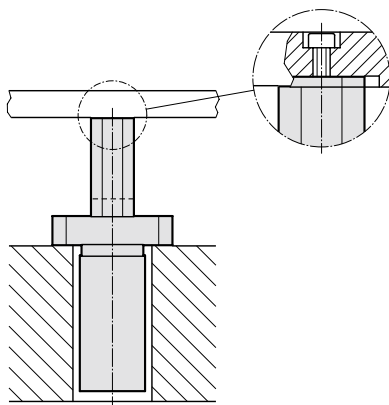
Spring forces as per spring diagram.

2478.30. . 1

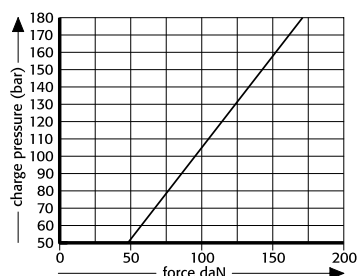


2478.30. . 1  
Stock lifter

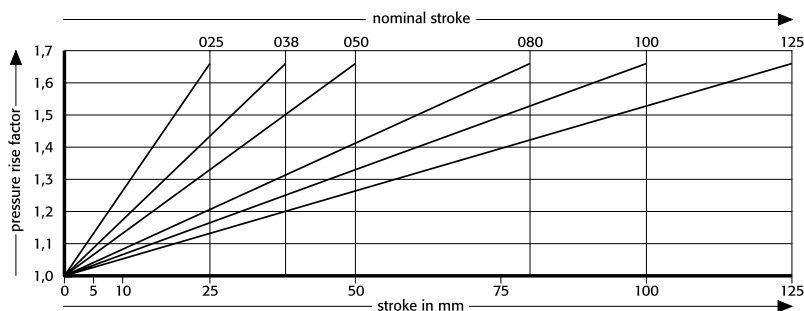
Order No	Stroke <sub>max.</sub>	l <sub>min.</sub>	l
2478.30.00170.025.1	25	87	112
2478.30.00170.038.1	38	100	138
2478.30.00170.050.1	50	112	162
2478.30.00170.080.1	80	145	225
2478.30.00170.100.1	100	165	265
2478.30.00170.125.1	125	190	315



Initial spring force  
versus charge pressure



Spring force Diagram displacement  
versus stroke rise



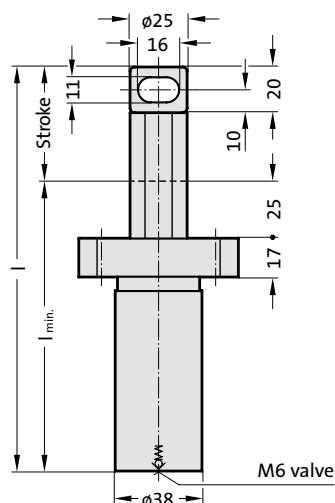
Pressure rise factor accounts for displacement but not external influences!



## Stock lifter with attachment lug



2478.30. .2



### Description:

The cylinder base can be used for topping up and reducing gas pressure and for interconnection arrangements.

### Note:

Stocklifters are equipped with a "PowerLine" 2487.12.00170. gas spring with no option for wear compensation, so complete replacement is required.

Pressure medium: Nitrogen –  $N_2$

Max. filling pressure: 180 bar

Min. filling pressure: 25 bar

Working temperature: 0°C to +80°C

Temperature related force increase:  $\pm 0,3\%/^{\circ}C$

Max. recommended extensions per minute:

approx. 40 to 100 (at 20°C)

Max. piston speed: 1,6 m/s

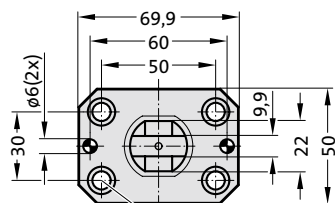
Max. effective travel: 100%

Spring forces as per spring diagram.

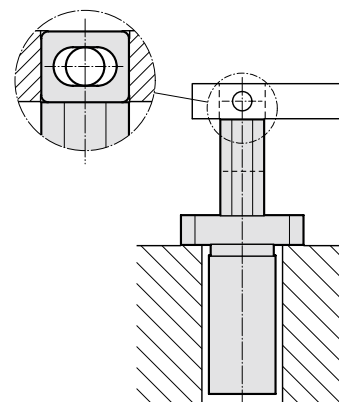
2478.30. .2

Stock lifter with attachment lug

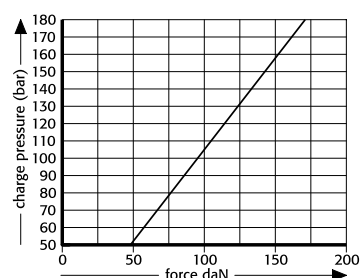
Order No	Stroke <sub>max.</sub>	$l_{min.}$	$l$
2478.30.00170.025.2	25	102	127
2478.30.00170.038.2	38	115	153
2478.30.00170.050.2	50	127	177
2478.30.00170.080.2	80	160	240
2478.30.00170.100.2	100	180	280
2478.30.00170.125.2	125	205	330



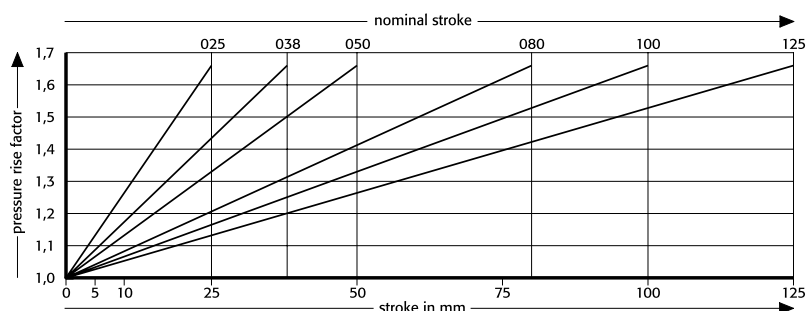
Counterbore for socket cap screw M8(4x)



Initial spring force  
versus charge pressure



Spring force Diagram displacement  
versus stroke rise



Pressure rise factor accounts for displacement but not external influences!

# Stripper

Description:

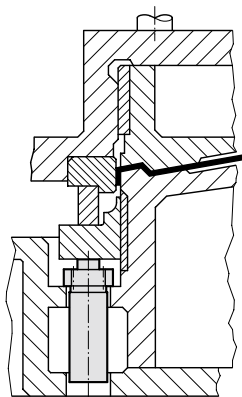
The stripper is used for stripping 2478.30.00170.3 of sheet metal parts after the forming operation (eg folding functions). Gas refill, reduce and composite assembly are possible over the cylinder tube sheet.

Note:

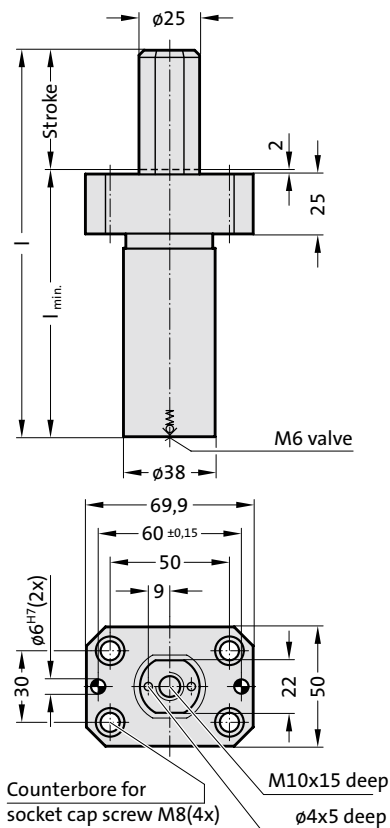
Strippers are equipped with a "Power Line" 2487.12.00170. gas spring with no option for wear compensation, so complete replacement is required.

Pressure medium: Nitrogen - N<sub>2</sub>  
 Max. filling pressure: 180 bar  
 Min. filling pressure: 25 bar  
 Working temperature: 0°C at +80°C  
 Temp. related force increase: ± 0,3%/°C  
 Max. recommended extensions per minute:  
 approx. 40-100 (at 20°C)  
 Max. piston speed: 1,6 m/s  
 Max. effective travel: 100%

Spring forces as per spring diagram.



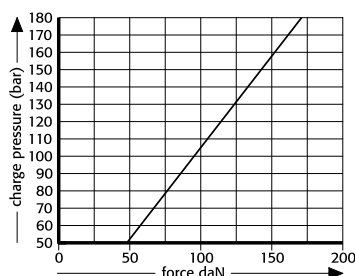
2478.30..3



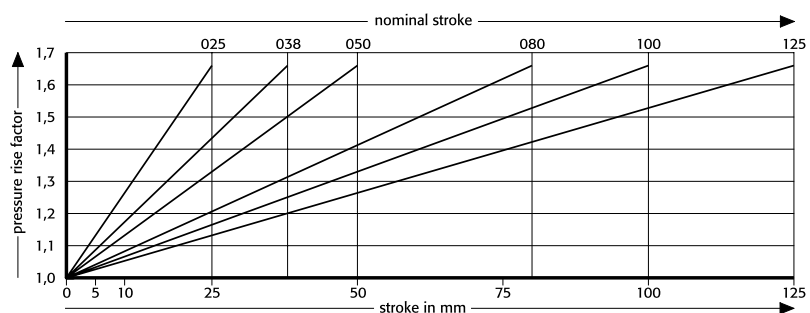
2478.30..3  
Stripper

Order No	Stroke <sub>max</sub>	l <sub>min</sub>	l
2478.30.00170.025.3	25	87	112
2478.30.00170.038.3	38	100	138
2478.30.00170.050.3	50	112	162
2478.30.00170.080.3	80	145	225
2478.30.00170.100.3	100	165	265
2478.30.00170.125.3	125	190	315

### Initial spring force versus charge pressure



### Spring force Diagram displacement versus stroke rise



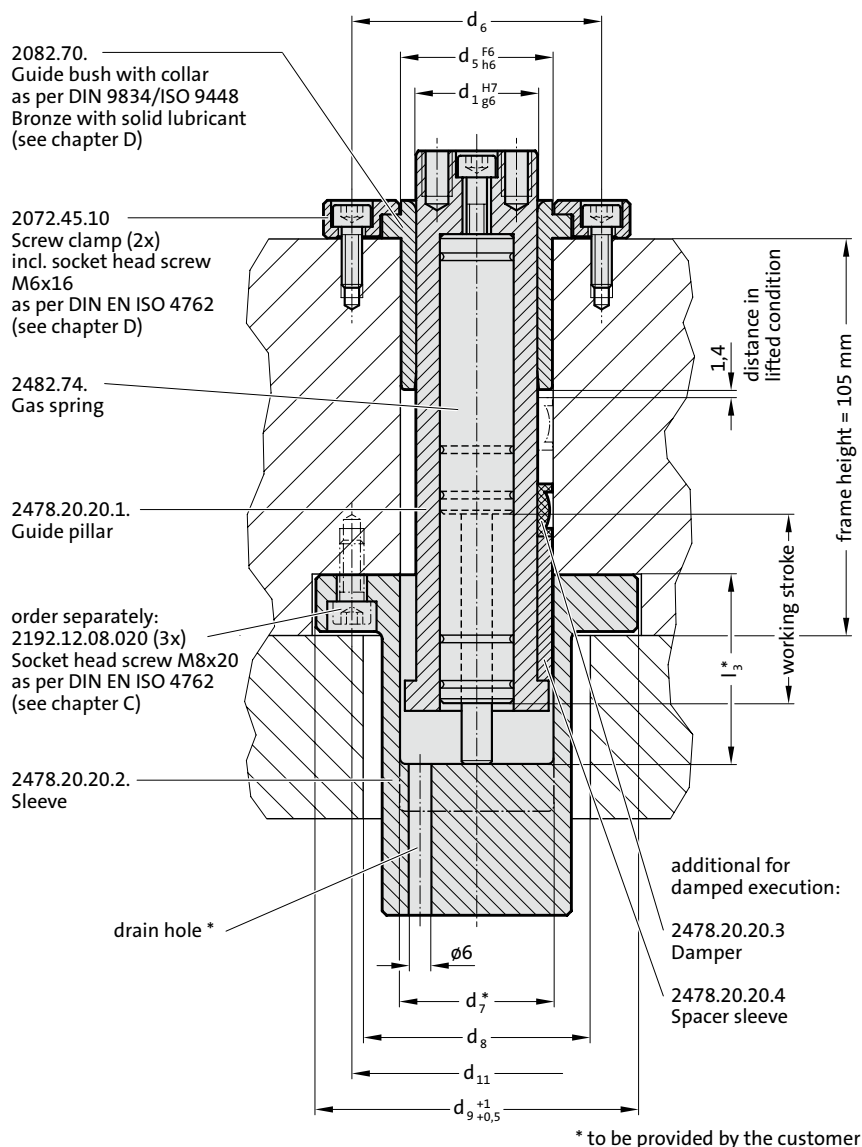
Pressure rise factor accounts for displacement but not external influences!





## Lifting unit (not damped/damped) to Mercedes-Benz

2478.20.20.



### Note:

Frame height = 105 mm

Depending on the frame height and the installation type of the sleeve 2478.20.20.2. ( $l_3$  - tapped bore in the frame or cut-out in the cast), the countersink varies for the determination of the lifting path.

#### Size 2\* - type, damped

Maximum lifting path 66 mm  
Lifting path 66 mm; Distance height 0 mm  
Lifting path 30 mm; Distance height 36 mm

#### Size 3\* - type, damped

Maximum lifting path 80 mm  
Lifting path 80 mm; Distance height 47 mm  
Lifting path 70 mm; Distance height 57 mm

In order to maintain the clearance of 1.4 mm in a raised state (damper to bushing), a distance sleeve is to be used between the damper and guide post flange.

\* Distance height determined at the customer (deliver length: 61 mm).

## 2478.20.20. Lifting unit (not damped/damped) to Mercedes-Benz

Size	working stroke	working stroke, damped	$d_1$	$d_5$	$d_6$	$d_7^*$	$d_8$	$d_9$	$d_{11}$	$l_3^*$
1	5 - 35	—	32	40	66	40	60	85	67	—
2	40 - 70	30 - 66	32	40	66	40	60	85	67	—
3	75 - 115	70 - 80	32	40	66	40	60	85	67	—

\* to be provided by the customer

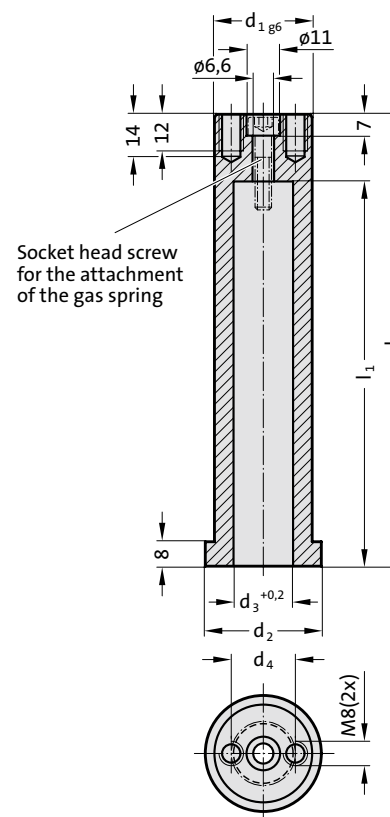
The lifting unit must be ordered in three sizes with the respective order numbers of the individual parts:

Size	1	2	3
Guide Pillar	2478.20.20.1.01	2478.20.20.1.02	2478.20.20.1.03
Sleeve	—	2478.20.20.2.02	2478.20.20.2.03
Guide bush	2082.70.032	2082.70.032	2082.70.032
Gas spring	2482.74.00090.038	2482.74.00090.080.1	2482.74.00090.125
Holding piece (2x) incl. socket head screw M6x16 DIN EN ISO 4762	2072.45.10	2072.45.10	2072.45.10
additional for damped execution:			
Damper	—	2478.20.20.3	2478.20.20.3
Spacer sleeve	—	2478.20.20.4	2478.20.20.4

# Guide pillar for lifting unit to Mercedes-Benz



2478.20.20.1.



## Material:

Steel, surface hardened Induction hardened 60+3 HRC Hardness penetration depth > 1.8 mm

## Note:

The socket head screw for the attachment of the gas spring is included with delivery.

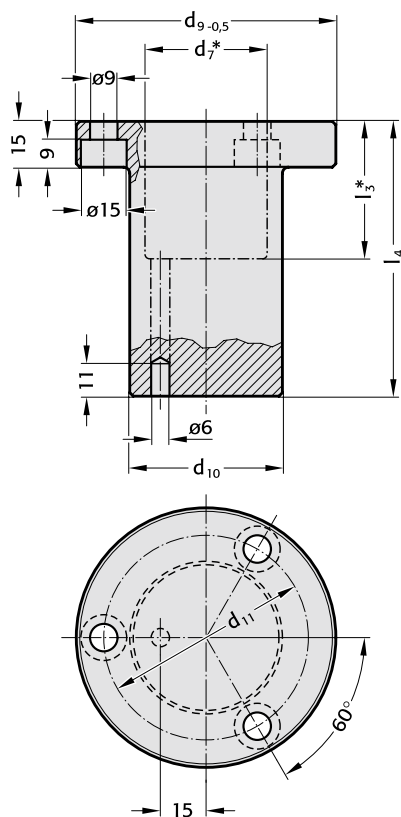
## 2478.20.20.1. Guide pillar for lifting unit to Mercedes-Benz

Order No	Size	$d_1$	$d_2$	$d_3$	$d_4$	$l_1$	$l_2$
2478.20.20.1.01	1	32	38	19.5	21	81	113
2478.20.20.1.02	2	32	38	19.5	21	126	148
2478.20.20.1.03	3	32	38	19.5	21	176	208



## Sleeve for lifting unit to Mercedes-Benz

2478.20.20.2.



### Material:

Steel

### Note:

The sleeve is supplied without countersink. Integrating countersink  $d_7$  ( $\phi 40$ )  $\times$   $l_3$  (\*to be provided by the customer) determines the lifting path. The drain hole is pre-drilled as a blind hole with a  $\phi$  of 6 mm and must also be modified.

## 2478.20.20.2. Sleeve for lifting unit to Mercedes-Benz

Order No	Size	$d_9$	$d_{10}$	$d_{11}$	$l_4$
2478.20.20.2.02	2	85	50	67	90
2478.20.20.2.03	3	85	50	67	150

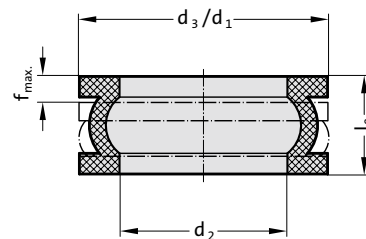




# Damper for lifting units to Mercedes-Benz



2478.20.20.3



## Description:

The damper element made of co-polyester elastomer is used in the jacking units in progressive dies in the automotive and white goods industry. Increasing stresses on screws and bolts are reduced by the low stress dampers. Reduced noise emission is also an additional positive side-effect. Two-ply dampers can be used depending on the mass or stroke.

## Benefits:

- High absorption of force and energy
- Slight settlement
- Long service life and high level of operating safety

- Noise reduction
- High degree of effectiveness

## Material:

Co-Polyester-Elastomer  
Available in 55 Shore-D hardness levels.

## Technical data:

Surroundings: Resistant to microbes, seawater, chemicals.  
No absorption of water and no swelling.  
Approved temperature range: -40°C to +90°C (-40°F to +194°F)

## 2478.20.20.3 Damper for lifting units to Mercedes-Benz

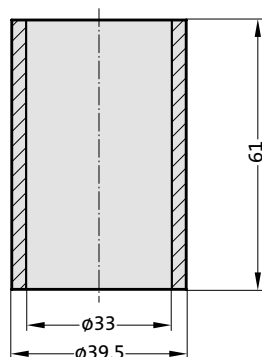
Order No	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>0</sub>	f <sub>max</sub> in mm	W <sub>3</sub> in Nm/stroke*
2478.20.20.3	39.5	32.2	39.6	12.6	3.6	4

\*Total energy per stroke



## Spacer sleeve for lifting units to Mercedes-Benz

2478.20.20.4



### Material:

Steel, hardened

### Note:

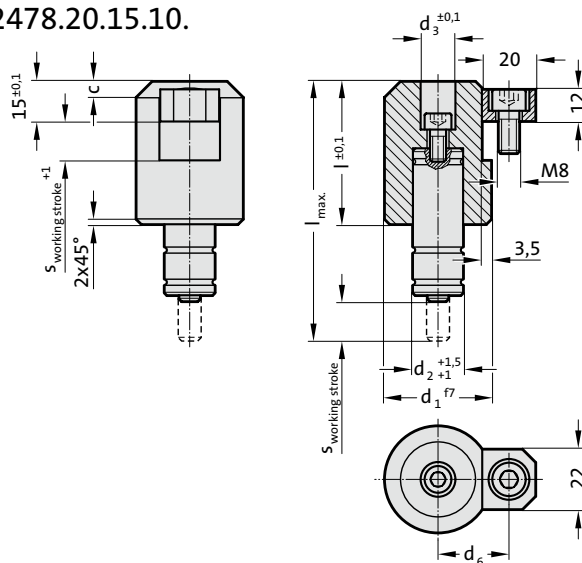
Height adjustment according to lifting path while using lifting unit  
2478.20.20.

2478.20.20.4    Spacer sleeve for lifting units to Mercedes-Benz

## Lifter, round with pilot pin hole to BMW standard



2478.20.15.10.



### Execution:

Assembly consisting of:

- Lifter
- Gas spring
  - Ø 19 mm (1) = 2482.74.00090. Spring force 90 daN
  - or
  - Ø 25 mm (2) = 2480.21.00200. Spring force 200 daN
- Screw clamp, incl. Socket head screw M8×16 to ISO 4762
- Socket head screw M6×12 to ISO 4762

### Note:

\*S<sub>working stroke</sub> suitable = max. allowable spring stroke minus 10 % stroke reserve of nominal stroke length, from stroke of 50 mm only max. 5 mm.

on request, gas spring with a lower spring force available.

## 2478.20.15.10. Lifter, round with pilot pin hole to BMW Standard

	d <sub>1</sub>	28	28	30	30	35	35	40	40	40	40	40	50	50	50	50					
	d <sub>2</sub>	19	19	19	19	25	25	19	19	19	25	25	19	19	25	25					
	d <sub>3</sub>	10.5	12.5	10.5	12.5	12.5	16.5	10.5	12.5	16.5	12.5	16.5	12.5	16.5	12.5	16.5					
	d <sub>6</sub>	20.5	20.5	21.5	21.5	24	24	26.5	26.5	26.5	26.5	26.5	31.5	31.5	31.5	31.5					
	c	4x45°	4x45°	5x45°	5x45°	5x45°	5x45°	6x45°	6x45°	6x45°	6x45°	6x45°	8x45°	8x45°	8x45°	8x45°					
	Stroke																				
	Order No																				
I	I <sub>max.</sub>	*S <sub>working stroke</sub>	(Part 3)	(Part 2)																	
			49	87	9	009	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
			53.5	97	13.5	014	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
			62.5	117	22.5	023	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
			74	143	34	034	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
			85	167	45	045	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
			98.5	197	58.5	059	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
			115	230	75	075	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
			135	270	95	095	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.
			160	320	120	120	.111.	.112.	.121.	.122.	.232.	.233.	.141.	.142.	.143.	.242.	.243.	.152.	.153.	.252.	.253.

### Ordering Code (example):

Order No: Part 1

Part 2

Part 3

2 4 7 8 . 2 0 . 1 5 . 1 0 . 1 5 3 . 0 0 9

	S <sub>working stroke</sub>	= Stroke - Order-No
	d <sub>3</sub>	= Order-No
	10.5 mm	= (1)
	12.5 mm	= (2)
	16.5 mm	= (3)
	d <sub>1</sub>	= Order-No
	28 mm	= (1)
	30 mm	= (2)
	35 mm	= (3)
	40 mm	= (4)
	50 mm	= (5)
	d <sub>2</sub> – Gas spring	= Order-No
	Ø 19 mm – 2482.74.00090.	= (1)
	Ø 25 mm – 2480.21.00200.	= (2)
	Assembly (lifter with pilot pin hole)	
	to BMW Standard	
	lifter, round with pilot pin hole	

# Lifter units with installation block according to BMW standard



Material: Steel

## Execution:

Lifter unit with installation block comprises:

- Installation block
- Lifter
- Screw clamp
- Gas spring 2482.74.00090. or 2480.21.00200.
- Socket cap screw according to ISO 4762  
M6 × 20 (1x), M8 × 20 (1x), M8 × 25 (2x), M10 × 45 (2x)
- Dowel pin according to ISO 8735  $\varnothing 10 \times 40$  (2x)

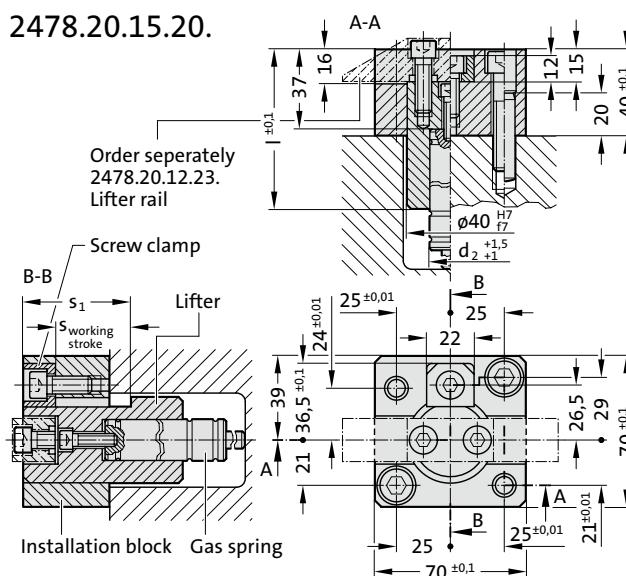
## Note:

Order separately (see installation example)

- 2478.20.15.23.: Lifter rail
- 2478.20.15.24.: Holding sleeve

on request, gas spring with a lower spring force available

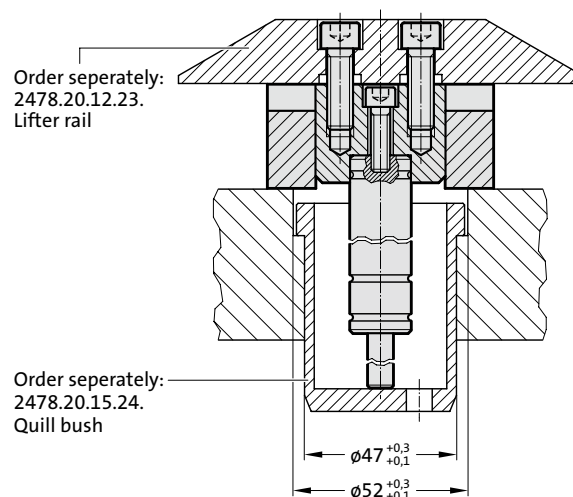
2478.20.15.20.



## 2478.20.15.20. Lifter Units with Installation Block according to BMW standard

l	S <sub>working Stroke</sub>	S <sub>1</sub>	d <sub>2</sub> = $\varnothing 19$		d <sub>2</sub> = $\varnothing 25$	
			Gas spring	Order No.	Gas spring	Order No.
49	9	25	2482.74.00090.010.2	2478.20.15.20.14.009	2480.21.00200.010	2478.20.15.20.24.009
53.5	13.5	29.5	2482.74.00090.015.2	2478.20.15.20.14.014	2480.21.00200.015	2478.20.15.20.24.014
62.5	22.5	38.5	2482.74.00090.025.2	2478.20.15.20.14.023	2480.21.00200.025	2478.20.15.20.24.023
74	34	50	2482.74.00090.038.2	2478.20.15.20.14.034	2480.21.00200.038	2478.20.15.20.24.034
85	45	61	2482.74.00090.050.2	2478.20.15.20.14.045	2480.21.00200.050	2478.20.15.20.24.045
98.5	58.5	74.5	2482.74.00090.063.2	2478.20.15.20.14.059	2480.21.00200.063	2478.20.15.20.24.059
115	75	91	2482.74.00090.080.2	2478.20.15.20.14.075	2480.21.00200.080	2478.20.15.20.24.075
135	95	111	2482.74.00090.100.2	2478.20.15.20.14.095	2480.21.00200.100	2478.20.15.20.24.095
160	120	136	2482.74.00090.125.2	2478.20.15.20.14.120	2480.21.00200.125	2478.20.15.20.24.120

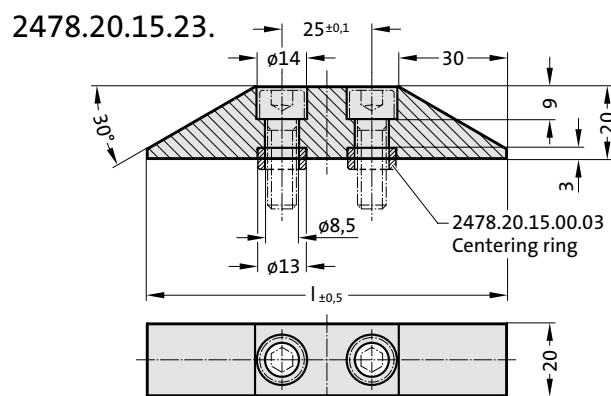
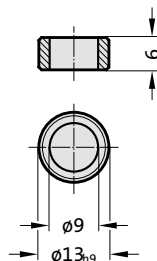
## Installation example:



## Lifter rail for lifter units to BMW standard Holding sleeve for lifter units to BMW standard



**2478.20.15.00.03**  
Centrierring  
(Order-No. for reordering)



### Material:

Steel

### Note:

Delivery without screws and centring rings

Screws and centring rings are already included in the scope of delivery for the lifter units 2478.20.15.20./30./40.

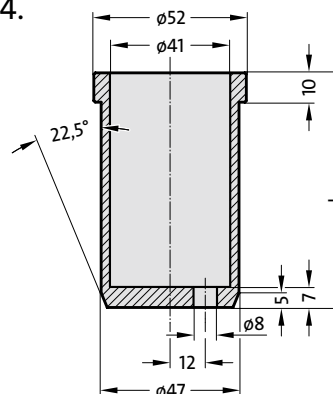


### 2478.20.15.23. Lifter rail

Order No.	l
2478.20.15.23.2020.100	100
2478.20.15.23.2020.125	125
2478.20.15.23.2020.150	150
2478.20.15.23.2020.175	175
2478.20.15.23.2020.200	200
2478.20.15.23.2020.250	250
2478.20.15.23.2020.300	300
2478.20.15.23.2020.350	350
2478.20.15.23.2020.400	400
2478.20.15.23.2020.450	450
2478.20.15.23.2020.500	500
2478.20.15.23.2020.550	550
2478.20.15.23.2020.600	600



### 2478.20.15.24.



### Material:

Steel

### Note:

Holding sleeve 2478.20.15.24. can only be used for lifter 2478.20.15.20./30./40. Ø 40 mm.

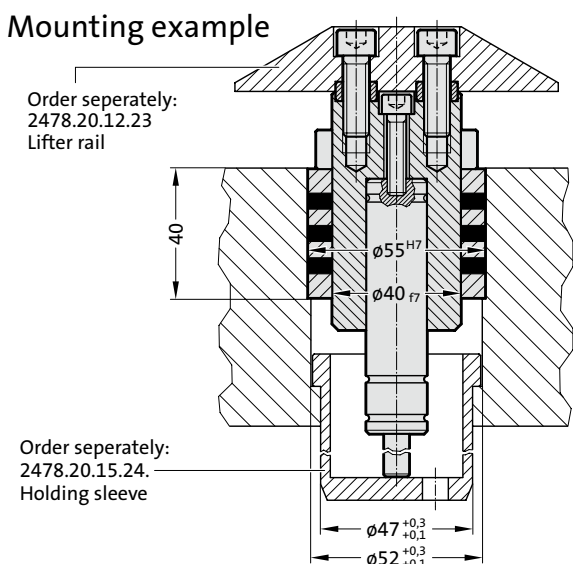
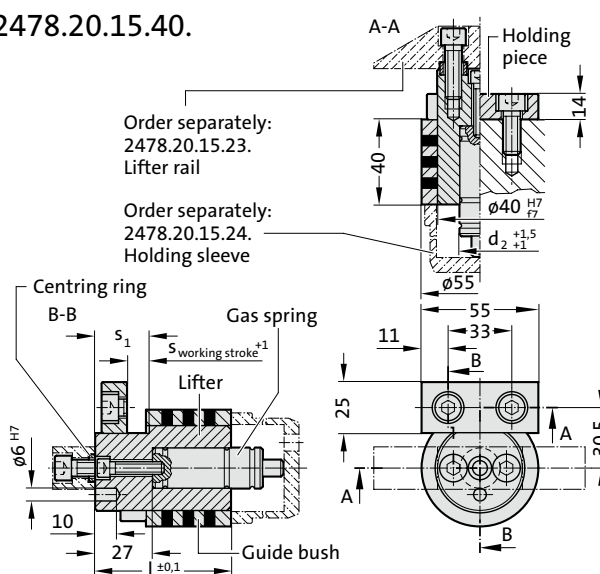
This is required when the panel is not thick enough. (see installation example 2478.20.15.20./30./40.).



### 2478.20.15.24. Holding sleeve

Order No.	l
2478.20.15.24.04.030	30
2478.20.15.24.04.040	40
2478.20.15.24.04.050	50
2478.20.15.24.04.060	60
2478.20.15.24.04.070	70
2478.20.15.24.04.080	80
2478.20.15.24.04.090	90
2478.20.15.24.04.100	100
2478.20.15.24.04.110	110
2478.20.15.24.04.120	120
2478.20.15.24.04.130	130
2478.20.15.24.04.140	140
2478.20.15.24.04.150	150
2478.20.15.24.04.160	160
2478.20.15.24.04.170	170
2478.20.15.24.04.180	180
2478.20.15.24.04.190	190
2478.20.15.24.04.200	200



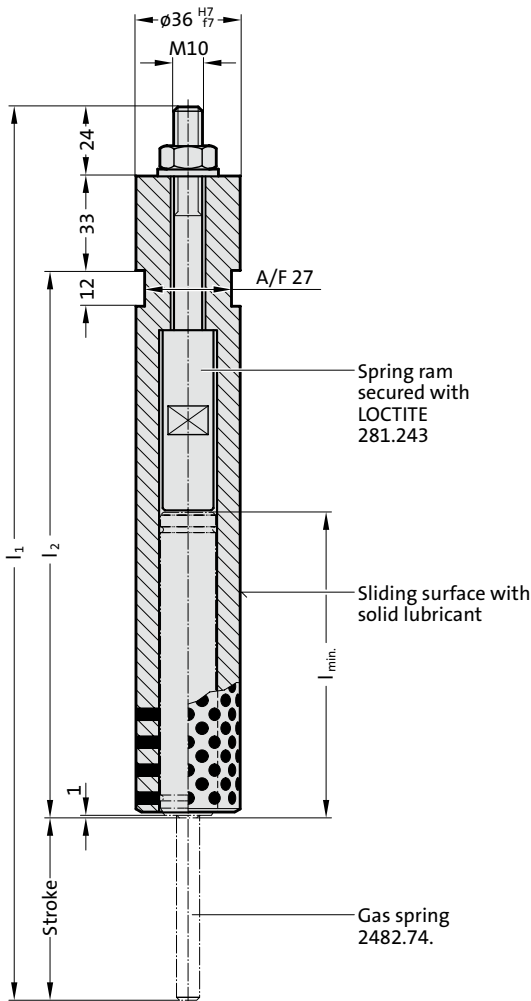
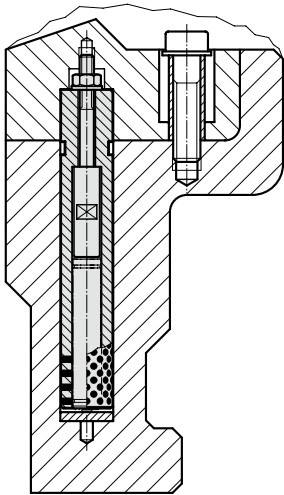


- 2478.20.15.23.: Lifter rail
- 2478.20.15.24.: Holding sleeve

# Spring ram with gas spring



Mounting example 2478.



**Material:**  
 C45  
 induction hardened 58+4 HRC  
 Hardness penetration depth 0,8+0,4  
 Sliding surface with non-liquid lubricant

## 2478. Spring ram with gas spring

Order No	Stroke <sub>max.</sub>	l <sub>min.</sub>	l <sub>1</sub>	l <sub>2</sub>	Spring force [daN] initial	Spring force [daN] final	Gas spring
2478.050.00030.1	50	92	257	150	30	40	2482.74.00030.050
2478.050.00050.1	50	92	257	150	50	67	2482.74.00050.050
2478.050.00070.1	50	92	257	150	70	94	2482.74.00070.050
2478.050.00090.1	50	92	257	150	90	120	2482.74.00090.050
2478.063.00030.1	63	109	310	190	30	40	2482.74.00030.063.1
2478.063.00050.1	63	109	310	190	50	67	2482.74.00050.063.1
2478.063.00070.1	63	109	310	190	70	94	2482.74.00070.063.1
2478.063.00090.1	63	109	310	190	90	120	2482.74.00090.063.1
2478.080.00030.1	80	125	360	223	30	40	2482.74.00030.080.1
2478.080.00050.1	80	125	360	223	50	67	2482.74.00050.080.1
2478.080.00070.1	80	125	360	223	70	94	2482.74.00070.080.1
2478.080.00090.1	80	125	360	223	90	120	2482.74.00090.080.1

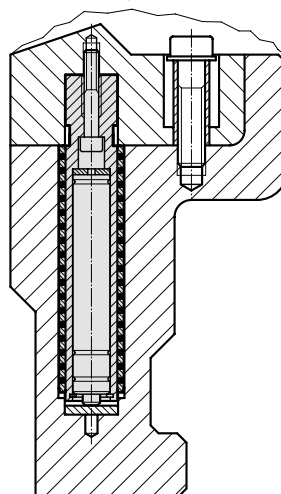
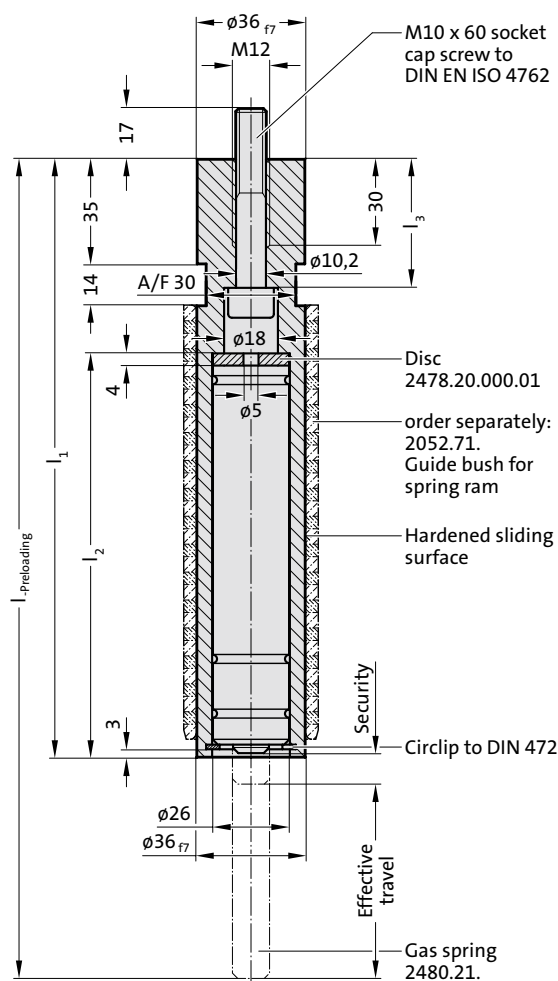




# Spring ram with gas spring to VW standard

2478.20. .1

## Mounting example



## Material:

Spring ram: C45  
induction hardened 58+4 HRHardness penetration depth 0,8+0,4

Disc: 90MnCrV8  
hardened 56+4 HRC

## Note:

Use only with matching guide bush 2052.71.!

Spring bolt installed preloaded.

## 2478.20. .1 Spring ram with gas spring to VW standard

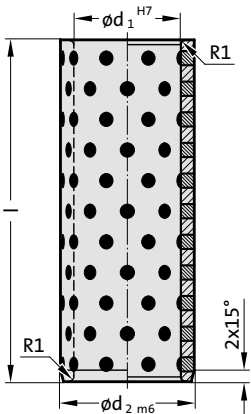
Order No	Stroke <sub>max.</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	Spring force [daN]		Gas spring
						initial	final	
2478.20.050.00050.1	50	240	182	118	42.5	50	68	2480.21.00050.063
2478.20.050.00100.1	50	240	182	118	42.5	100	137	2480.21.00100.063
2478.20.050.00150.1	50	240	182	118	42.5	150	206	2480.21.00150.063
2478.20.050.00200.1	50	240	182	118	42.5	200	275	2480.21.00200.063
2478.20.065.00050.1	65	274	200	135	43.5	50	68	2480.21.00050.080
2478.20.065.00100.1	65	274	200	135	43.5	100	137	2480.21.00100.080
2478.20.065.00150.1	65	274	200	135	43.5	150	206	2480.21.00150.080
2478.20.065.00200.1	65	274	200	135	43.5	200	275	2480.21.00200.080
2478.20.080.00050.1	80	314	220	155	43.5	50	68	2480.21.00050.100
2478.20.080.00100.1	80	314	220	155	43.5	100	137	2480.21.00100.100
2478.20.080.00150.1	80	314	220	155	43.5	150	206	2480.21.00150.100
2478.20.080.00200.1	80	314	220	155	43.5	200	275	2480.21.00200.100



Guide bush for spring ram 2478.20. .1



2052.71.



**Material:**  
Bronze with solid lubricant, oilless lubricating.

**Note:**  
Recommended locating bore for bonding G7.

2052.71. Guide bush for spring ram  
2478.20. .1

Order No	$d_1$	$d_2$	$l$
2052.71.036.045.115	36	45	115
2052.71.036.045.145	36	45	145
2052.71.036.045.170	36	45	170