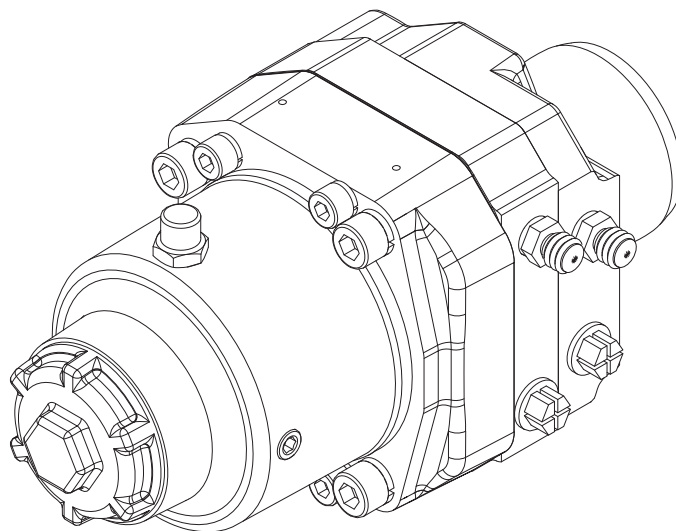


Service Manual

Exchange Spring loaded brake cylinder

5350.089	5350.094
5350.090	5350.098
5350.091	5350.099
5350.093	5350.112



General Information

Spring loaded brake cylinders are a part of safety relevant components of NAF driving units. All driving units of Co. NAF, inclusive safety relevant components such as spring loaded brake cylinders, steering cylinders and so on, must be repaired or exchanged by qualified service centers.

Using the instruction

This manual is designed only for the costumers of Co. NAF or for the machine manufacturer.

This manual describes the modification from the old generation to the new generation of spring loaded brake cylinders, as well as the exchange of separate sub-assemblies of the newest generation.



Note!

The newest generation of spring loaded brake cylinders is divided in sub-assemblies. Exchange of separate parts, such as seal rings et cetera, is not possible anymore. For repair, the complete sub-assembly must be changed.



Attention!

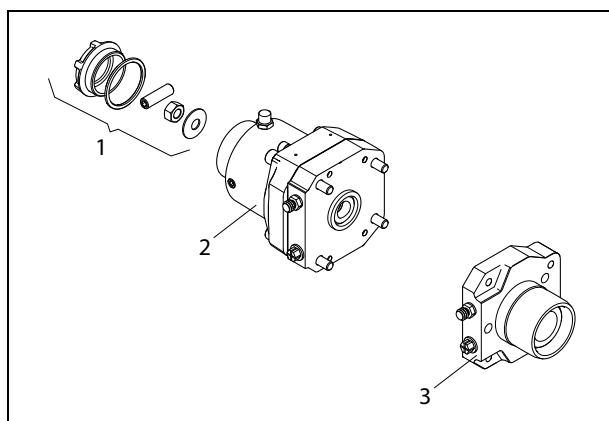
Danger to life and limb by loss of braking force, if single parts or sub-assemblies are mounted from new generation of spring loaded brake cylinders to old generation of spring loaded brake cylinders.

Assemblies

The new generation of spring loaded brake cylinders is divided into three sub-assemblies.

Sub-assemblies are only available as a complete assembly.

It is not possible to order single parts.



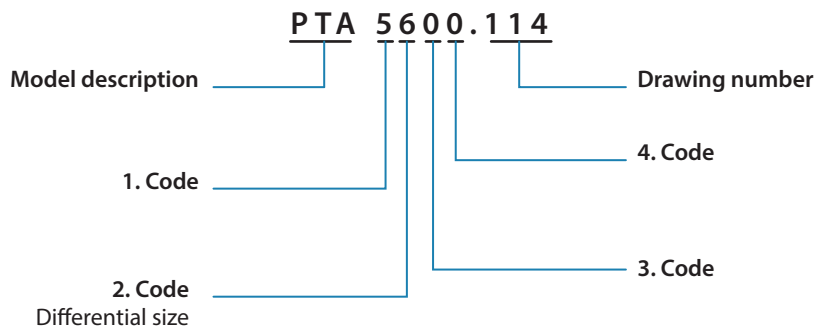
Spring loaded brake cylinder

Nr.	Sub-assembly
1	Park brake release kit
2	Spring loaded upper part
3	Brake cylinder lower part

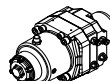
Technical data

At NAF drive units, there are two different sizes of multi discs available. Which size is mounted in the drive unit, can be read on the installation drawing.

The size of the multi disc can be determined from the differential size.



Spring loaded brake cylinder

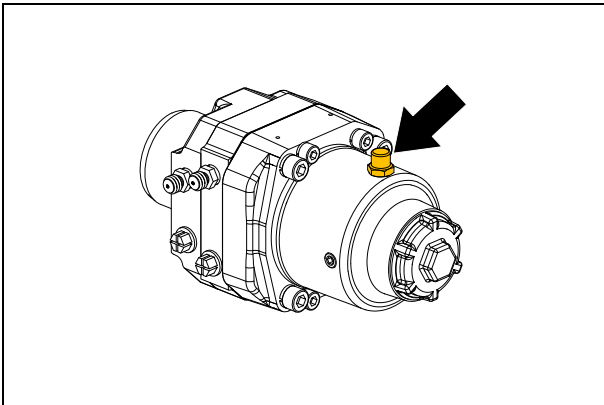


Brake		Differential size					Clearance		Piston stroke
Multi-Servo	Mono-Servo	4	5	6	7	8	2.2 mm	2.9mm	
	6.5"	•	•				•		5.25 mm
6.5"		•	•					•	5.25 mm
8.75"				•	•	•		•	5.25 mm

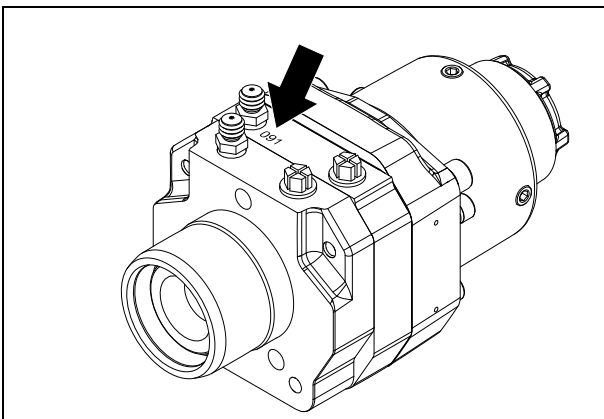
Spare part order

At the time of ordering replacement spring loaded brake cylinder, only the newest generation cylinders will be delivered.

Spring loaded brake cylinders of the old generation are no longer available. Part numbers of spring loaded brake cylinders can be read from the spare part list of the drive unit or from the spring loaded upper part.



Spring loaded brake cylinder of the newest generation are recognizable by the visible additional breather on the top.



.Remove paint careful with a wire brush from spring loaded upper part .

Replacement of Spring loaded brake cylinder to the newest version

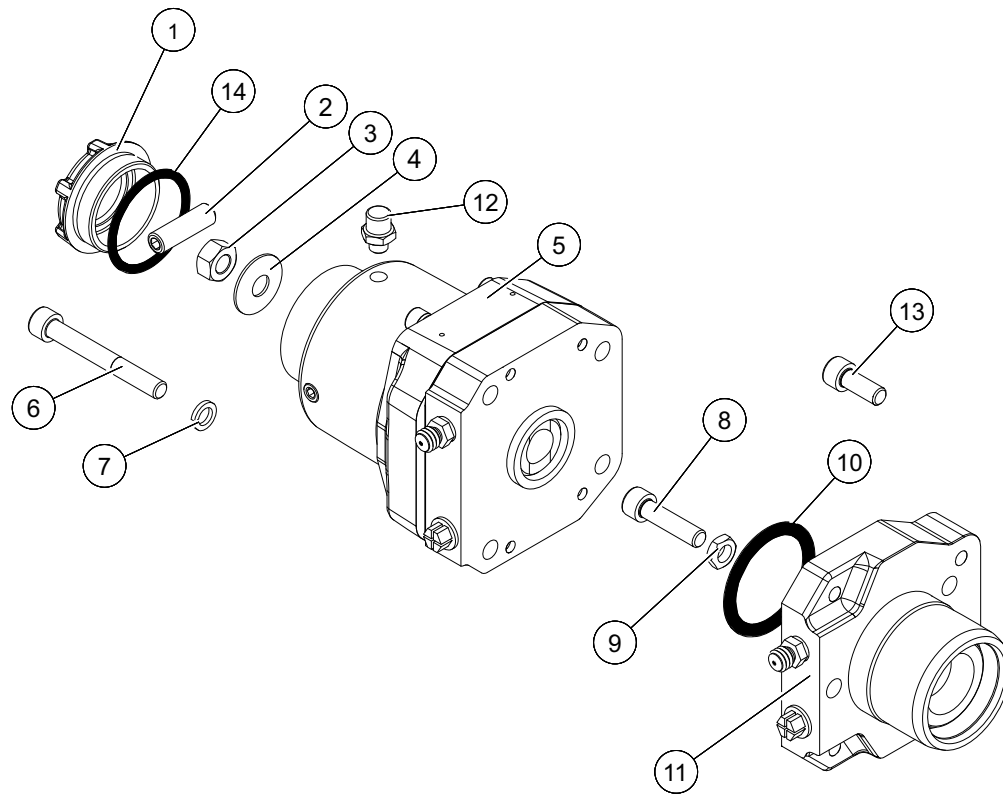
We advise the replacement from the old generation of spring loaded brake cylinders to the newest generation always, in order to avoid leaks.

It is possible to up date directly from the oldest version to the newest version.

An overview of the history about spring loaded brake cylinders shown in the table below.

Spring loaded brake cylinder complete			Sub assembly new generation			Comment
Previous version		New generation				
	Replaced by			Spring loaded upper part	Brake cylinder lower part	
5350.048	5350.063	5350.089	5350.111	5350.097	2208.004	
5350.049	5350.064	5350.090	5350.100	5350.097	2208.004	
5350.061	5350.066	5350.093	5350.100	5350.105	2208.004	
5350.062	5350.067	5350.094	5350.100	5350.106	2208.004	
5350.050	5350.068	5350.090	5350.100	5350.097	2208.004	
5350.065	5350.069	5350.091	5350.104	5350.097	2208.004	
	5350.070	5350.090	5350.100	5350.097	2208.004	
5350.058	5350.071	5350.098	5350.111	5350.106	2208.004	
5350.051	5350.072	5350.089	5350.111	5350.097	2208.004	
5350.057	5350.073	5350.099	5350.111	5350.105	2208.004	
	5350.081	5350.098	5350.111	5350.106	2208.004	
	5350.082	5350.099	5350.111	5350.105	2208.004	
	5350.083	5350.091	5350.104	5350.097	2208.004	
	5350.085	5350.112	5350.108	5350.107	2208.004	
	5350.086	5350.091	5350.104	5350.097	2208.004	

Parts overview



Nr.	Part	Comment
1	Screw plug	
2	Threaded stud	
3	Nut	
4	Bevel spring	
5	Spring loaded upper part	
6	Allen screw	
7	Lock washer	
8	Allen screw	additional locked with Loctite® 242
9	Nut	
10	O-ring	
11	Brake cylinder lower part	
12	Breather	
13	Allen screw	Verbus plus® coated
14	O-ring	

Up dating Spring loaded brake cylinder to the newest generation

General information

Replacement spring loaded brake cylinders are delivered with activated park brake release.



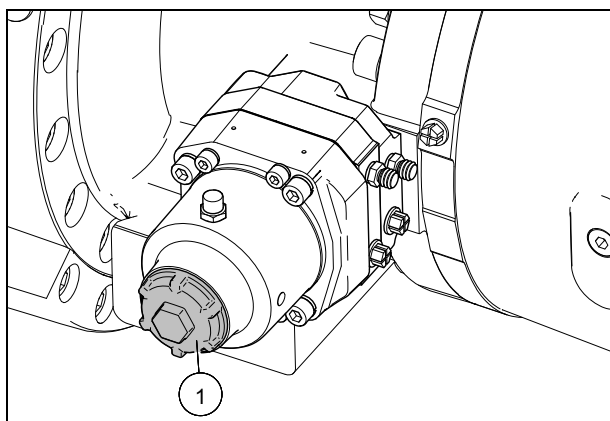
Attention!

Before any repair, the park brake release must be activated.

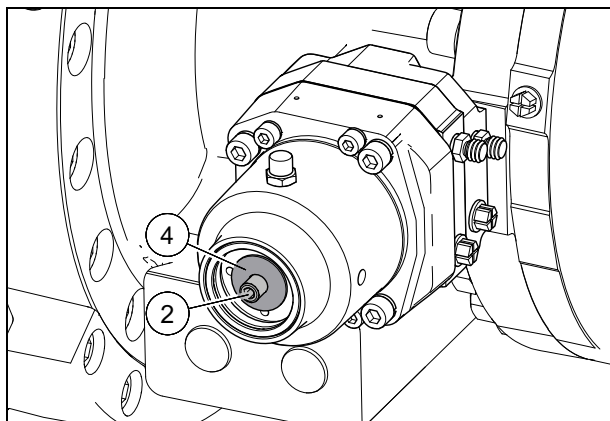
Spring loaded brake cylinder is under high pressure. The spring loaded upper part must be removed with activated park brake release kit only. There is a risk by exploding parts.

Exchange of brake cylinder upper part

- Stop machine.
- Secure machine with chocks to prevent rolling.
- De pressurise spring loaded brake cylinder.
- Clean spring loaded brake cylinder.
- Remove hydraulic lines.
- Unscrew screw plug (1).

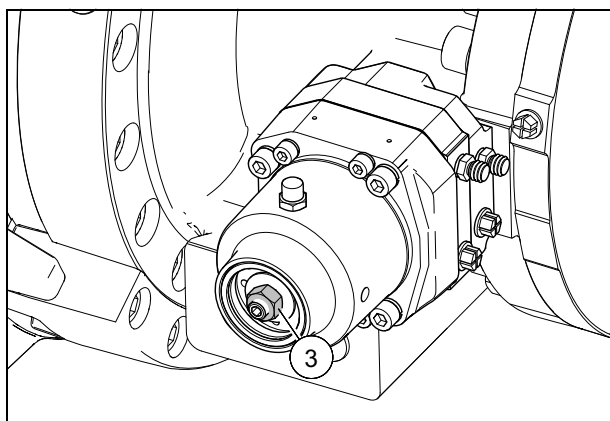


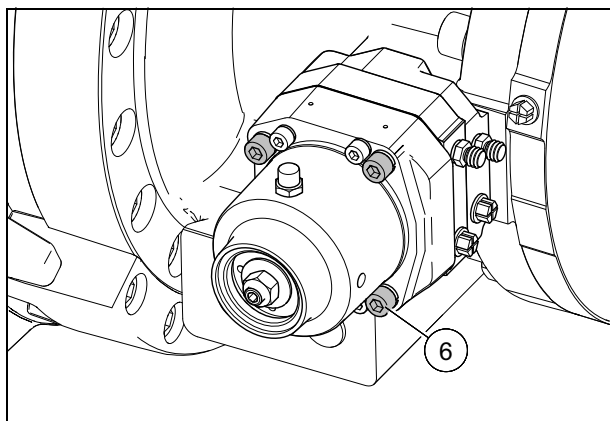
- Screw thread stud (2) into spring loaded upper part.
- Fit bevel spring (4) with dish to outer direction on thread stud.



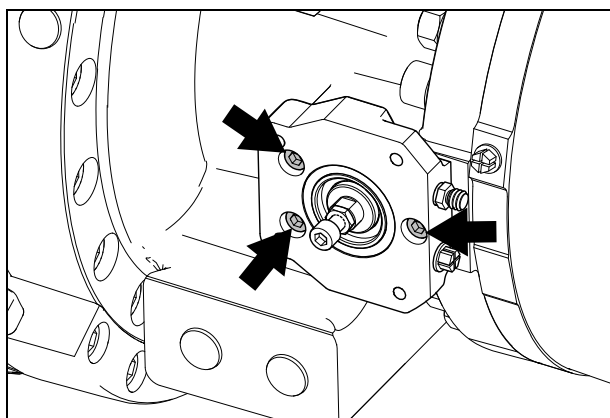
- Screw nut (3) onto thread stud.
- Lock thread stud with an allen key.
- Screw in nut clockwise until tight.

Now the bevel springs are compressed. The park brake release is activated now.

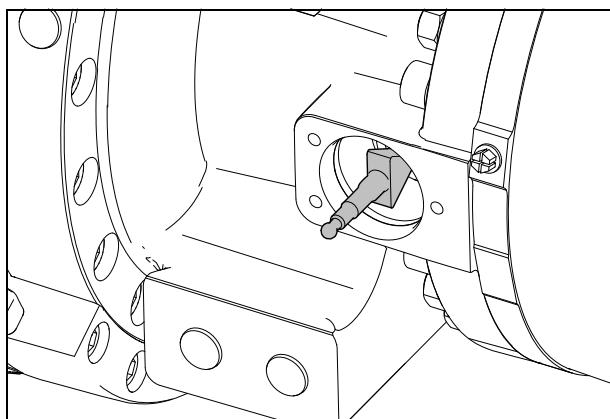




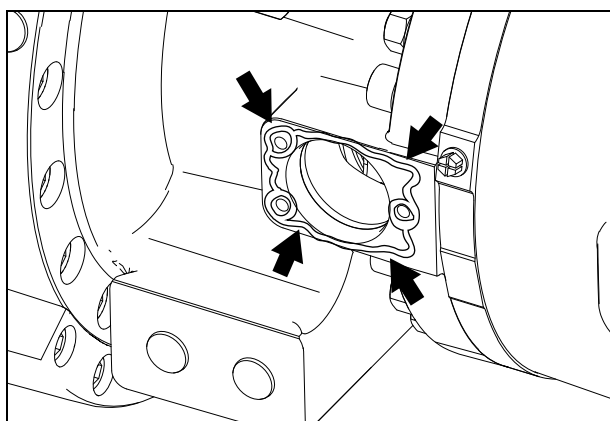
- Unscrew allen screws (6) on the outer direction.
- Remove spring loaded upper part from brake cylinder lower part.



- Unscrew allen screws (arrows).
- Remove brake cylinder lower part from axle housing.



- Remove wedge from axle housing.



- Remove sealing compound remains on the sealing surface with a rotating brush.
- Clean sealing surface.

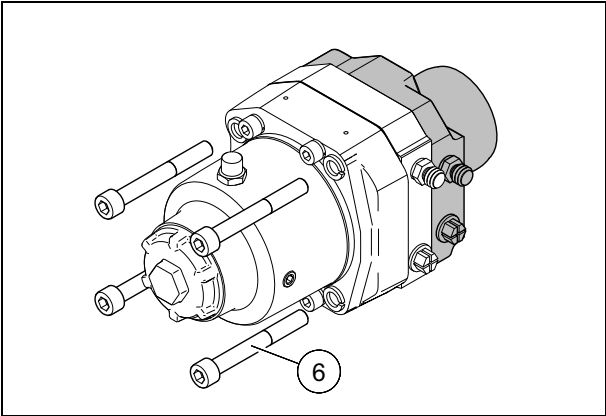
The sealing surface must be free of oil and grease.

- Apply sealing compound onto the clean surface with a line thickness of 2 ... 3 mm.

Sealing compound **Loctite® 518**

- Distribute sealing compound equal over the complete surface.

Mount braking cylinder lower part within five minutes after applying sealing compound.

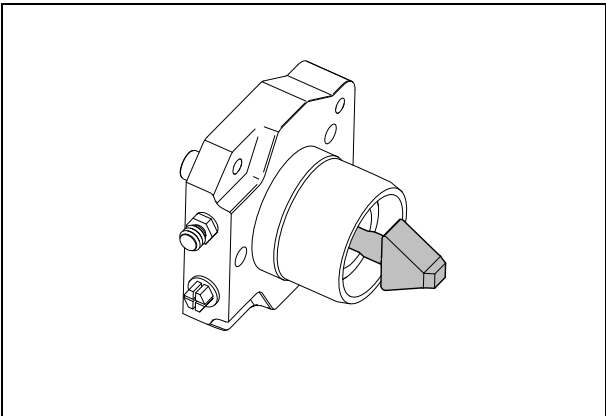


- Unscrew braking cylinder lower part from spring loaded upper part.

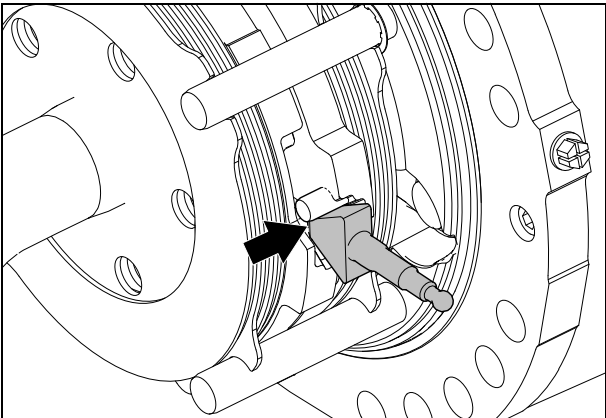


Note!

To separate spring loaded upper part from braking cylinder lower part, only the allen screws (6) on the outer direction must be unscrewed.



- Fit wedge into braking cylinder lower part.
- Position cam faces of wedge to mate with pressure rollers in the brake actuator.



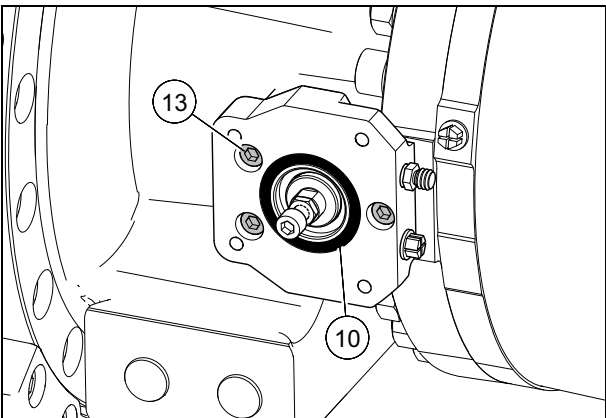
- Mount brake cylinder lower part with allen screw (13) to axle housing.



Note!

Allen screws are Verbus plus® coated and must be replaced at every repair in order to prevent unscrewing.

- Replace allen screws (13).



- Fit o-ring (10) into cylinder.

Nr.	Part	Nm
13	Brake cylinder lower part onto Axle housing	75

- Unscrew allen screw (8) from piston.
- Screw nut (9) until thread head of the allen screw (8).
- Clean thread of allen screw (8).

The thread must be free of grease, oil and preservatives.

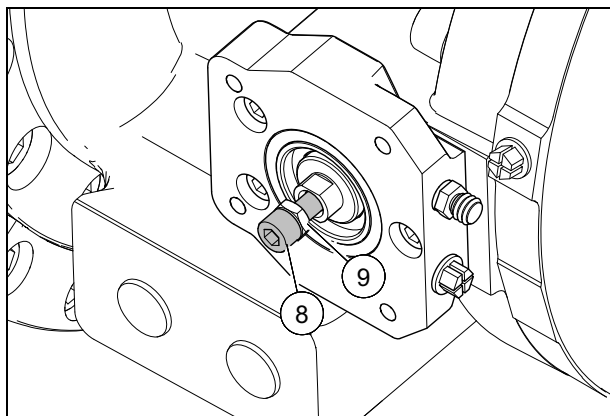
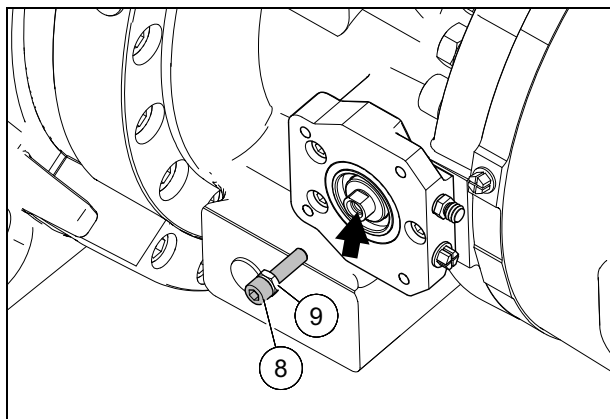
- Apply *Loctite*® 242 to the entire length and circumference of the thread.
- Apply *Loctite*® 242 to the length of ca. 10 mm on the internal thread of the piston.



Attention!

Danger to human and machine.
Loss of power by incorrectly locking threaded stud.

- Apply screw lock *Loctite*® 242 careful onto allen screw.



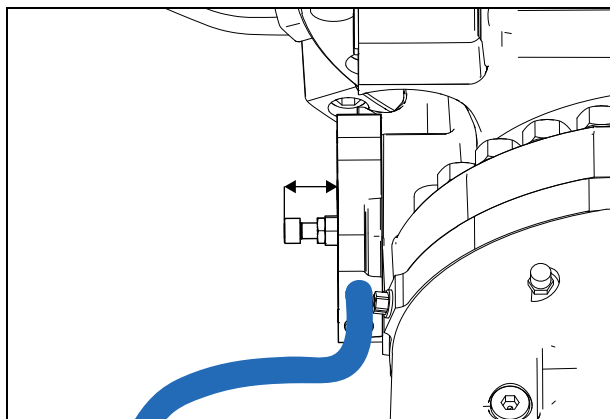
- Screw allen screw (8) into piston until there is a torque of 25 Nm.
- Screw allen screw (8) 3.5 to 4 rotations backwards - that is a length of 5.25mm.
- In that position the allen screw (8) must be locked with nut (9).

Nr.	Part	Nm
9	Lock allen screw with nut	40

- Remove excess sealing compound from braking cylinder lower part.

With this adjustment following adjustments are reached:

Brake	Clearance
6,5" Mono-Servo	2,2 mm
6,5" Multi-Servo	2,9mm
8,75" Multi-Servo	2,9mm



Checking piston stroke

- Measure distance between allen screw and flange surface.
- Pressurize brake cylinder lower part with 10 bar compressed air.
- Measure distance again and calculate piston stroke.

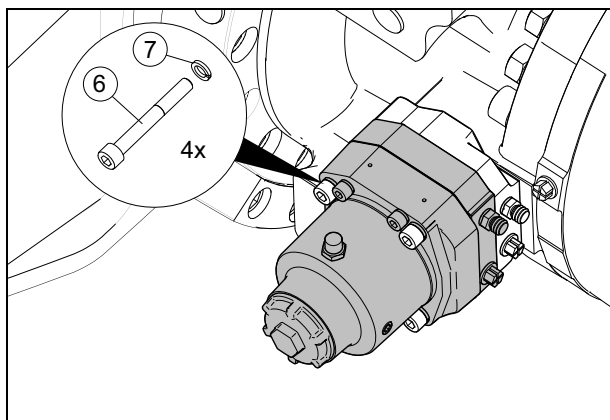
Piston stroke

5,25mm

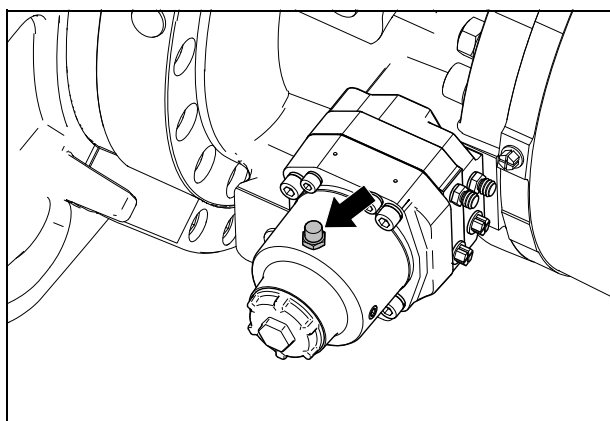
Mount Spring loaded upper part

- Screw spring loaded upper part with 4 screw plugs onto brake cylinder lower part.

Use lock washers.



Nr.	Part	Nm
6	Spring loaded upper part onto brake cylinder lower part	75

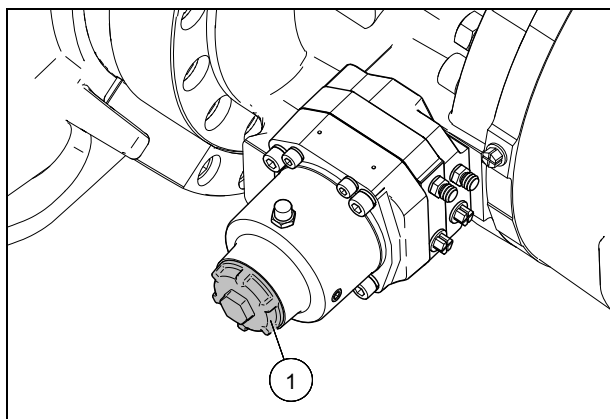


- Mount breather at top position.

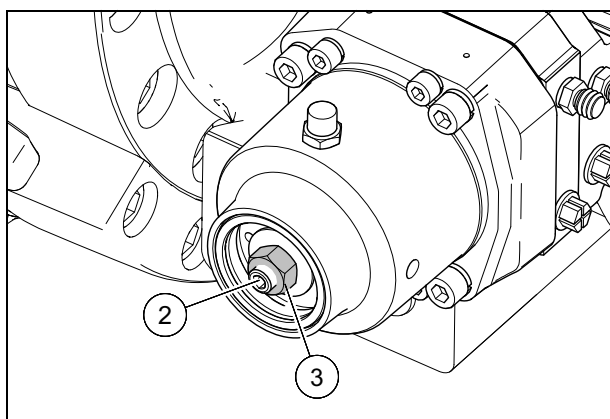


Attention!

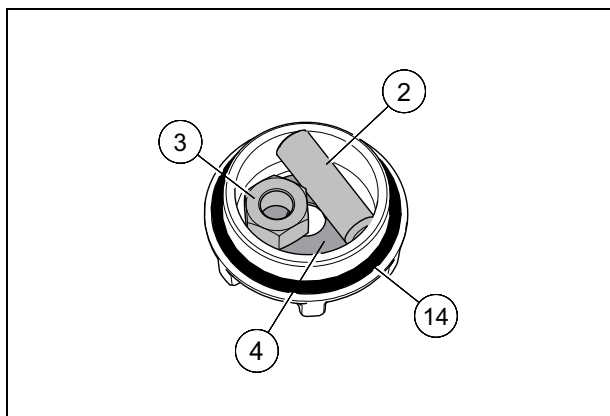
Danger of leaks and loss of power if breather is not mounted at the top („12 o'clock") position.



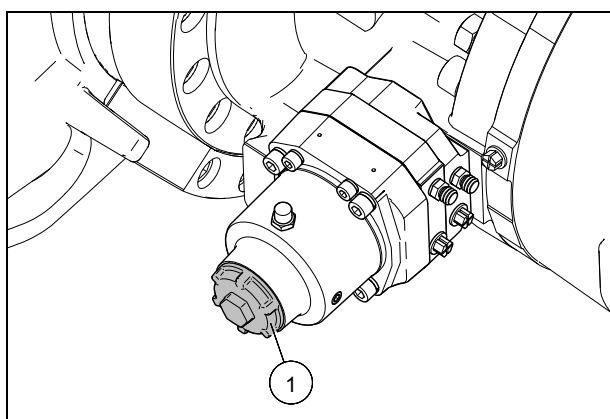
- Unscrew screw plug (1).



- Lock threaded stud (2) with an allen key.
 - Unscrew nut (3).
- The bevel springs in the spring loaded upper part are released.*
- Unscrew threaded stud (2).



- Store park brake release kit into screw plug.
- Fit o-ring (4) onto cover.



- Screw screw plug (1) hand tight - max. 30 Nm - onto spring loaded upper part.
- The spring loaded brake cylinder is in operational status now.*
- Connect spring loaded brake cylinder with hydraulic system.
 - Test brake.

Maintenance

General Information

Spring loaded brake cylinders are safety components and there must be checked at regular intervals. Because of desired oil film between oil seals and housing and because of high pressure working conditions of NAF components, a very small amount of light oil may pass into the spring-loaded housing. This so called „Weepage“ fluctuates by temperature changes. The function of the spring loaded brake cylinder is not affected by such low weepage rates. Weepage does not reflect damage to oil seals. Higher leak rates in short time may indicate oil seal damage.

With damaged oil seals, the spring loaded brake cylinder may not perform to the normal expectation.

In this case exchange of the complete spring loaded brake cylinder is required.



Attention!

There is danger to man and machine when safety components are not serviced or checked regularly.

– Adhere to regular service intervals.

Maintenance Table

General Maintenance		Maintenance interval in operating hours										
		1st time	daily	at			after every				yearly or every 2000h	as required
				50	100	500	100	250	500	1000		
Spring loaded brake cylinder												
Breather	visual check					●						
Excess oil in spring loaded part	drain									●		
Piston stroke	check											●
Spring loaded brake cylinder and area	Keep free of contamination									●		

General Rules for Maintenance intervals

Accumulated oil in the spring loaded section of the cylinder must be drained at regular intervals to maintain proper function of the cylinder.

Rapidly accumulating oil will pass through the breather externally indicating seal failure. The breather needs to be kept clear of contamination regularly.



Attention!

With accumulated oil in the spring loaded cylinder, the operation of the cylinder becomes sluggish.

Brakes may not release correctly.

- Drain accumulated oil from the spring loaded cylinder.
- Check cylinder regularly, according the service table.



Attention!

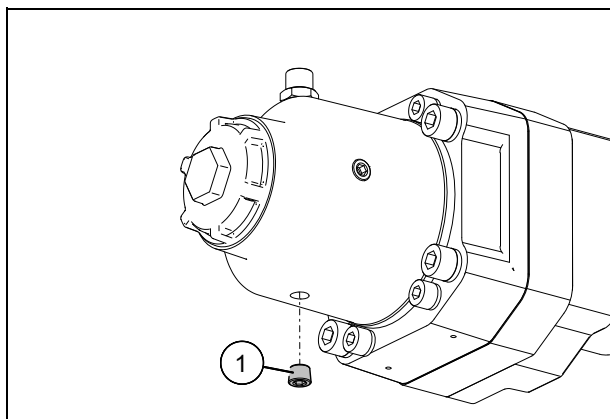
Rapidly escaping oil from the breather indicates fault oil seals.

- Exchange complete spring loaded brake cylinder.



Environment

Oil escaping from cylinder causes environmental damage, if leakage oil was not regularly drained.



Draining excess oil from spring loaded cylinder

- Position drain pan under spring loaded cylinder.
- Remove plug (1) from bottom of cylinder.
- Let oil completely.
- Reinstall drain plug (1) and lightly tighten.