



ON-LINE MANUAL

Maintenance

7. Maintenance and repair

7.1. Maintenance

Under normal circumstances, the pneumatic vibrator units themselves do not require any kind of maintenance if they are operated in a proper way.

We suggest checking the vibrating system at regular intervals to insure that it is functioning properly. The frequency of the system can be measured with the help of a Vibrometer. A change in frequency is always the first indication for a loss in vibrating power.

NOTE: The frequency of a vibrator may vary depending on the size of the air compressor and the air reservoir. Make sure frequency and power measurements are obtained only when the reservoir is filled.

Required regular maintenance for the air pressure supply includes checking the following at regular intervals :

- The air filter for accumulation of dirt (clogging). This may lead to a loss in vibration energy. If clogged, wash out or replace.
- The silencer for accumulation of dirt (clogging). This may lead to a loss in vibration energy. If clogged, wash or replace. The FF-silencer (FOR piston vibrators) can be unscrewed into two pieces and blown out with compressed air.
- The lubricator for sufficient oil in the container.

NOTE: Very often vibrators are damaged because the lubricator runs out of oil. Therefore, make one person responsible either to keep the lubricators filled or to check the lubricators at regular intervals.

NOTE: For Piston Vibrators only !

The air lubricator may be filled with distilled water for the operation of piston vibrators. The materials (teflonized aluminum and leaded bronze) may be operated oilfree with only distilled water with excellent results. Operation with distilled water requires a 5 to 10 times higher flow rate than operation with oil because water is blown away very quickly, while oil adheres longer to the moving parts and the walls.

7.2. Troubleshooting

7.2.1. Vibrator does not start

- Piston Vibrator only: Remove it from the mount and hold it vertically in your hand. Turn it on. If it runs, check starter spring inside.

- Gumming of oil may keep the parts stuck together (mainly for FP- and DAR-Vibrators). Add ten drops of Kerosene (Petroleum) into the air pressure inlet to dissolve the gumming oil.
- If you suspect air pressure supply blockage:
 - Unscrew silencer or exhaust hose and run the vibrator. If it operates properly, then check the silencer or hose for clogging. If clogged, wash out (kerosene) or replace
 - Check air pressure to localize the blockage
 - at the compressor's site
 - at the maintenance unit (filter-regulator-lubricator)
 - at the end of the flexible tube

7.2.2. Vibrator does not always start

- Occurs in Piston Vibrators because they require a few seconds OFF- time before supplying again. Starter problems usually occur if the OFF-time cycle is extremely short.
 - The piston may need a few seconds to be pushed by the spring into the start position. This time depends on the manner of installation, with a longer supply pipe between valve and vibrator extending the OFF-time needed. Also, a clogged silencer will hinder the exhaust. To test this possibility, remove the silencer and run the vibrator. If it runs, then wash silencer out or replace it.
 - If the OFF-time required is short (less than 4 seconds), it is advantageous to use a 3-way valve so that the supply pipe to the vibrator is bled when switching OFF.
 - Using a hand-driven valve may sometimes cause starting problems if the air pressure is not moved through quickly enough. Electrically or pneumatically driven valves are recommended.
 - Insufficiently large tube or valve diameters may cause similar problems.

7.2.3. Vibrator runs too slow / Vibration power too low

New Installations

- Vibrators need up to 15 minutes to reach full power since excessive grease and anticorrosives have to be moved through.
- Adjust air pressure regulator to increase vibrator's speed
- Check that the air supply is connected to the inlet port and not to the exhaust port (arrow marks)
- Check that the flexible tube is not bent.
- Check to make sure that the inner span of the air pressure supply pipe (Paragraph 2.4. and 6.1.2.) is wide enough and not too long. Also check the inner span of the valves used.
- Check that there are not too many air consumers being operated at the same time with one air line. The consumers should be selectively controlled.

Existing Installations

- Remove silencer or exhaust hose. If the vibrator operates properly without them, then the silencer or exhaust hose is probably clogged with dirt. Wash out with petroleum (kerosene) or replace.
- Check the air line filter for accumulation of dirt. Air supply pipe irons may get rusty and these particles may clog the filter.
- Check the air supply for leaks. Make sure that the compressor is working continuously. Check to see if the flexible tube is bent.
- Eventually the lubrication oil will gum up. Add a few drops of petroleum (kerosene) into the air inlet port

to clean.

- Check vibrator for accumulation of dirt and clean with petroleum (kerosene).

7.2.4. Excessive noise during operation

High acoustic frequency:

- The vibrator is probably running too quickly or mounted too rigidly. Reduce the air pressure and adjust the vibrator to its optimal working frequency.
- The ball of ball vibrators may be worn out and cause an increase in frequency and a decrease in vibrating force.

Crackling sound

- Verify that the vibrator mounting screws are securely fixed
- If the bin or hopper is empty, cut down air supply.
- In turbine vibrators, ball bearings may be damaged

7.3. Repair

All FINDEVA vibrators except the K-series can be easily dismantled, maintained and repaired if necessary.

The following tools are necessary :

- Pin Wrench Pin 4, 5, 6, 7 or 8 mm (refer to list figure 7.1.)
- Vise with aluminum jaws
- Hammer
- For T-Turbines: Allen key (2.5 mm : T-50/-65 ; 3 mm : T-80/-100)

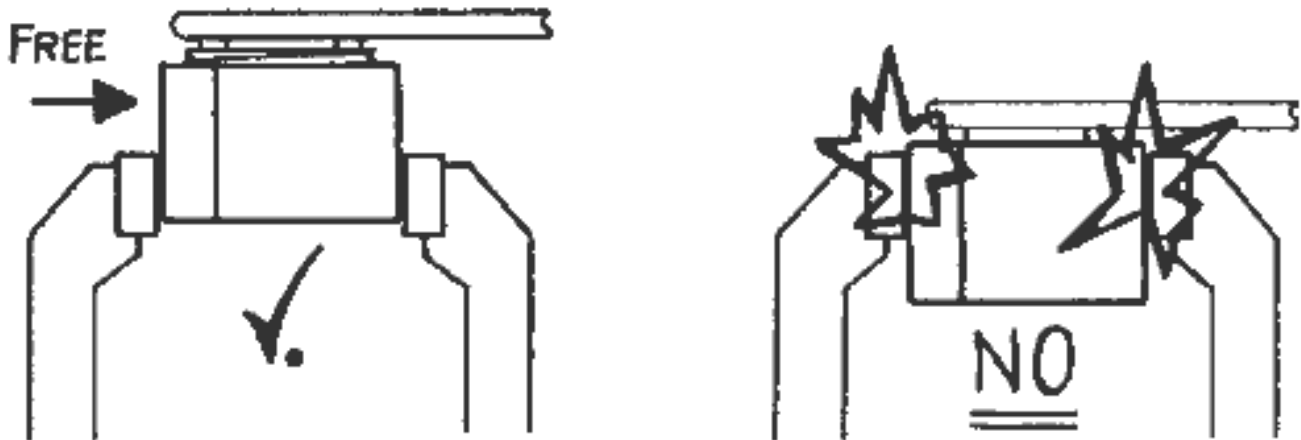
Wrench Pin diameter in mm	Models / Types			
	R	DAR	GT	FP
4	50	2	8/10	12/18
5	65	3	13/16	---
6	80	4	20/25	25/35
7	100	5	30/36	---

8	120	6/7	40/48	---
Turbine Vibrators : Pin dia. = 7 mm				

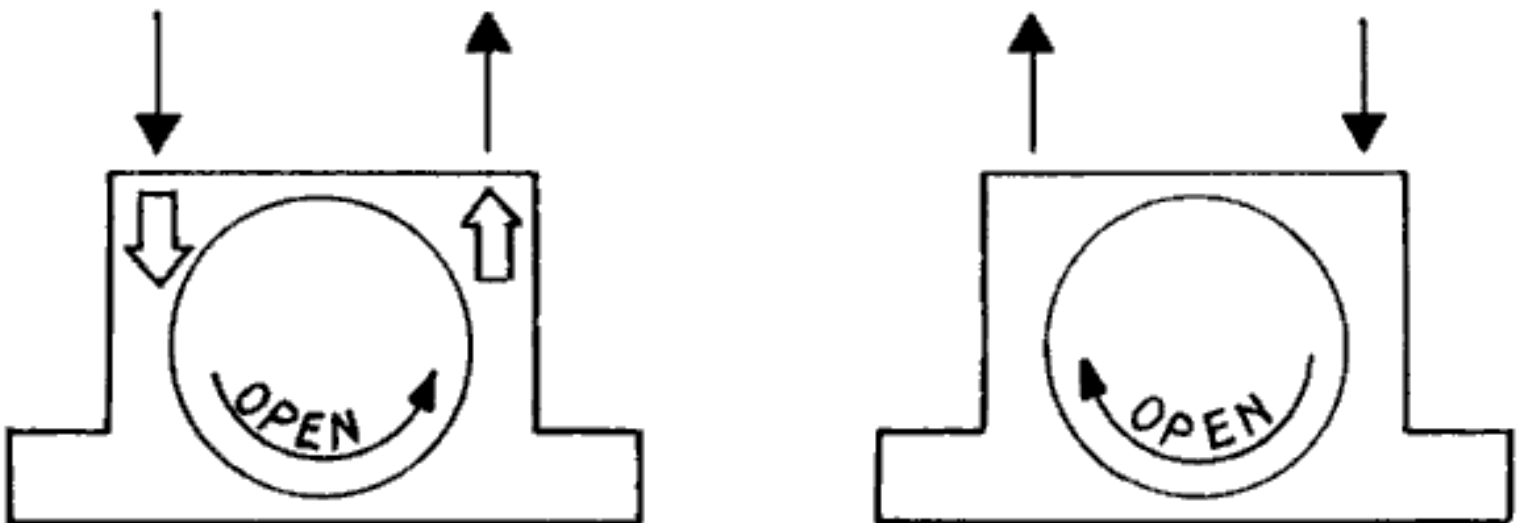
Fig. 7.1. : Pin wrench diameter cross reference

Place the vibrator as shown in figure 7.2. in the vise. Make sure that the part with the end cap to be loosened is not be pressed by the vise. Open the end cap in the same direction the rotor, ball or roller moves (figure 7.3.). Piston Vibrator end caps or sockets should be opened counter clockwise.

NOTE: If both end caps or the end cap and socket of a piston vibrator are to be opened, first loosen both sides before opening. This prevents the housing from breaking.



Do not press the end cap



Turning direction to open the end cap

NOTE: When changing parts, use only original parts. Other parts may not be of the same quality and may lead to malfunction.

7.3.1 Ball vibrators K-series

Ball vibrators should not be repaired since only the end caps and the ball can be replaced. If the ball is worn out, the races will be also, but the races can not be changed.

It is still possible to gain a few hundred hours of operation with a new ball.

The only way to open the end cap is to destroy it by drilling a hole into it. Check the races for cracks before closing again. A new end cap can be pressed in by hand.

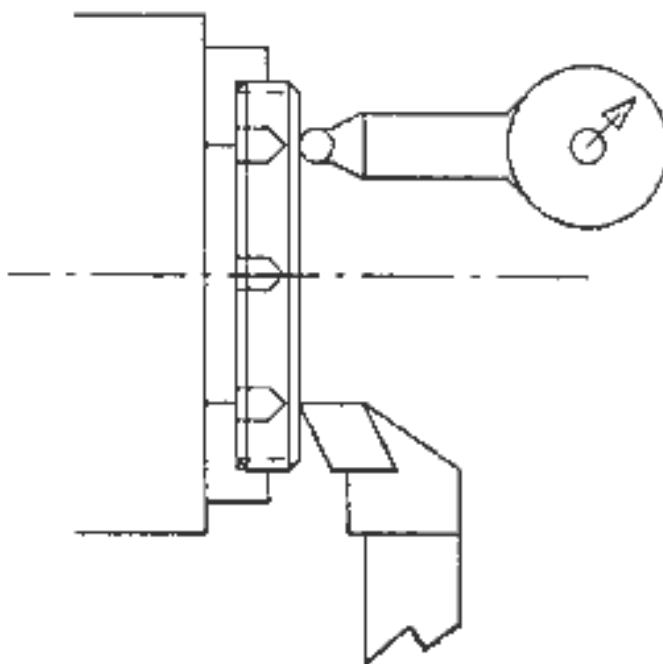
7.3.2. Roller vibrator R-series

When opening the vibrator check both of the black end caps for grooves due to abrasion of the roller. If grooves are visible it is an indication to use more lubrication and that the end caps should be changed. Please note that the end caps have right- and left-hand thread, and are sold in matched pairs only.

Also, check the roller race for rust, cracks, etc. Rust or other dirt particles may cause the roller to jump, causing the race to be worn out quickly.

It is possible to run the vibrator without the silencer plates on the end caps but the noise level will be greatly increased, and the silencer plates protect the vibrator from dirt entering through the exhaust holes.

7.3.3. Roller vibrator DAR-series



Overturn of the end plate

Like the R-series, the brass end caps may be worn out due to lack of lubrication or dirt contamination. If so place the end plate in a lathe as shown above. Check that the surface of the endplate is running true using D.T.I., and overturn the plate until it is even again.

This should be done before the groove is more than 30 µm (0.03 mm).

The total thickness of the endplate should not be less than shown below.

DAR-type DAR	-2	-3	-4	-5	-6	-7
Minimum thickness in mm	7	8	9	10	11	11

Minimum thickness of the brass end plate

Also, check the roller race for rust, cracks, etc. Rust or other dirt particles may cause the roller to jump, causing the race to be worn out quickly.

7.3.4. Turbine vibrator T-series

NOTE: Before opening the threaded end cap, make sure the Allen Key Screw on top of the housing is loosened to avoid destroying the thread.

The Allen key screw is a 2.5 mm (T-50 and T-65) or 3 mm type (T-80 and T-100). Open the threaded end cap counterclockwise. The other end cap is the same used with ball vibrator K-series and should not be moved away under normal circumstances.

The rotor and the ball bearings on its axles can be taken out of the housing. The ball bearings can be removed from the rotor's axles using a ball bearing extractor.

When reassembling the vibrator, the direction of the rotor blades is important, but the rotor cannot be mounted the wrong way because one end of the rotor axle contains a hole that fits into the fixed end cap.

When using a new threaded end cap make sure that the end cap is tightend before screwing in the Allen key screw. Now use a 4.2 mm drill (T-50 and T-65) or a 5.0 mm drill for T-80 and T-100 to spot-drill the end cap's thread through the allen screw hole, so that the headless Allen screw is securely blocking the end cap. Then, tighten the Allen key screw securely and place the sticker on the side of the end cap.

If new ball bearings are in use please note that the vibrator will need a few minutes to work up to its nominal frequency as the grease used in manufacturing is displaced.

When putting the vibrator back into operation, check the lubricator to make sure that it is operating properly and that the reservoir is filled.

7.3.5. Turbine vibrator GT-series

Under normal circumstances, the GT-Vibrator can only be opened on one side. The rotor and the ball bearings

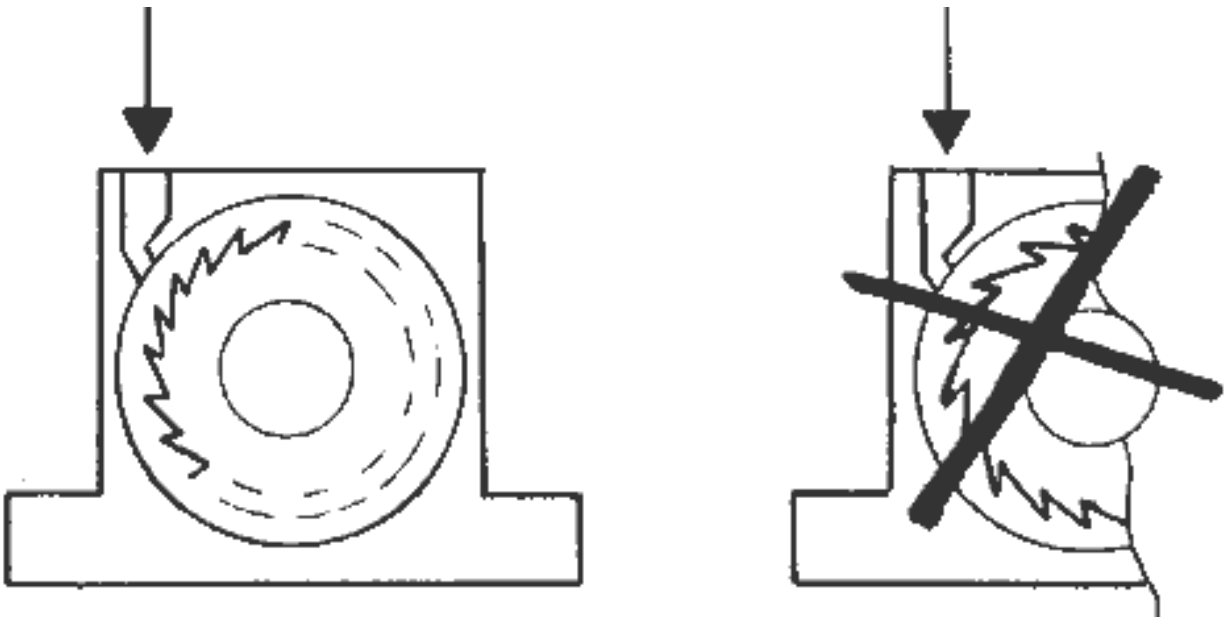
can be taken out, and the ball bearings can be removed from the axles very easily.

Please note that the ball bearings are not standard, since they must be shielded and they contain only one tenth of the standard amount of grease. This is sufficient to guarantee optimal greasing, while a standard amount of grease slows the frequency down considerably.

As a temporary solution to keep the production machines running, a pair of standard ball bearings may be used, but they must not be used longer than a few days while waiting for new original spare bearings to arrive.

NOTE: We do not recommend the use of other than the original spare ball bearings and will not take any responsibility for any damage resulting from the use of standard ball bearings.

When reassembling the vibrator, make sure that the rotor is mounted correctly. As shown in Fig. 7.6. the pockets of the rotor must be mounted so that the air pressure may fill them. Otherwise the rotor will turn, but with only about 50% of frequency and vibrating force.



Correct mounting of the rotor

Under normal circumstances a GT-vibrator will last longer than any other type of vibrator because changing the ball bearings makes the vibrator as good as a brand new one.

7.3.6 Piston vibrator FP-series

We recommend opening the socket end (the end with the metric mounting thread and the smaller diameter).

Check the spring for correct length and the piston for abrasion tolerance according to figure 7.7.

FP-Type	Nominal Diameter / Abrasion Tolerance	Spring Length Tolerance
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FP-12-S FP-12-M FP-12-L	11.985 mm / -20 μ m	L=13 mm +/- 3 mm L=17 mm +/- 3 mm L=20 mm +/- 3 mm
FP-18-S FP-18-M FP-18-L	17.985 mm / -15 μ m	L=19 mm +/- 3 mm L=22 mm +/- 3 mm L=25 mm +/- 3 mm
FP-25-S FP-25-M FP-25-L	24.985 mm / -10 μ m	L=26 mm +/- 3 mm L=32 mm +/- 3 mm L=42 mm +/- 3 mm
FP-35-S FP-35-M FP-35-L	34.985 mm / -5 μ m	L=30 mm +/- 3 mm L=34 mm +/- 3 mm L=38 mm +/- 3 mm

Fig. 7.7. : Piston abrasion tolerance and spring length tolerance

The vibrator will work if it is out of tolerance, but the leakage area between piston and boring increases with the square of the diameter. The higher the leakage the less vibrating power the vibrator is able to generate. This is especially important with both the larger models FP-25 and FP-35 because of their already large diameter. Hence, we strongly recommend lubricating the piston vibrator to avoid abrasion as much as possible.

When reassembling the vibrator, it is important to place the spring as shown in figure 7.8., with the smaller end of the spring against the piston, otherwise the spring will block and damage the vibrator.

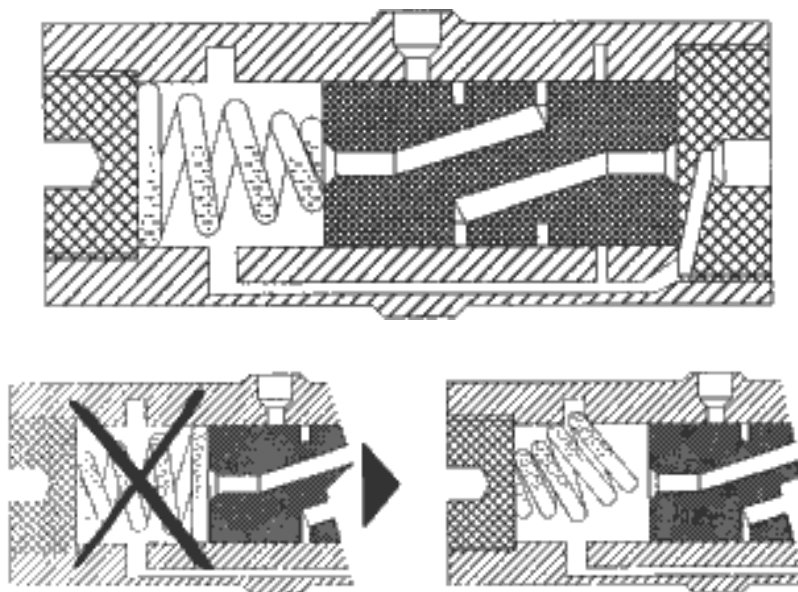


Fig. 7.8 - Correct / Incorrect installation of the spring

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