

Diprofil Classic Polishing/Filing Machines

Tool holder Ø 3,5 mm and Ø 6,4 mm

***Original Safety and
Operation Guide***



WARNING:

Give this guide to the operator of the machine. To reduce the risk of injury the operator must read and fully understand the Instructions in the Safety and Operation Guide before using or repairing these machines.

Diprofil Classic Machines

with Tool holder Ø 3,5 mm and Ø 6,4 mm

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INTRODUCTION

Thank you for choosing a Diprofil product. Since its introduction on the world market in 1950, the Classic Diprofil machine has become an indispensable part of the equipment needed for tool making.

The Classic machines are designed for polishing and finishing applications of moulds and dies, but may also be used for other fine mechanical work such as de-burring and filing.

The following safety and operation guidelines are intended for your safety and to get the maximum value from your machine in terms of efficiency, lifetime and ergonomics.

Before using the machine for the first time you must read and understand these instructions and be sure of the operating instructions.

SAFETY INSTRUCTIONS

WARNING = Indicates a potentially hazardous situation which, if not avoided, may result in a serious injury.

CAUTION = Indicates a potentially hazardous situation which, if not avoided, may result in a minor or moderate injury.

MACHINE AND TOOL HAZARDS

CAUTION

Starting the machine without the machine cover may cause personal injury.

CAUTION

Starting the machine, when changing tool or stroke length, may cause personal injury.

CAUTION

An incorrectly inserted tool may result in the tool slipping out during operation and cause personal injury. Before inserting the tool make sure that the shank dimension is correct. Because of the multi-functional tool holder it is important that the chosen tool is tightened properly and that the speed chosen is not too high. Try to avoid using heavier tools and longer stroke length than necessary for the specific application.

CAUTION

Unintentional start of the machine may cause injury.

PROJECTILE HAZARD

CAUTION

During lapping or filing, particles from the working material or tools can become projectiles and cause injuries to eyes or skin. Use approved personal protective equipment, including safety glasses.

NOISE HAZARD

CAUTION

Noise ≤ 70 dB(A) at 7.000 rpm (according to ISO 15744).

For lengthy use ear protection is recommended.

VIBRATION HAZARD

WARNING

Normal and proper use of the machine exposes the operator to vibration.

Regular and frequent exposure to vibration may cause, contribute to, or aggravate injury or disorders of the operator's fingers, hands, wrists, arms, shoulders and/or permanent injuries or disorders that may develop gradually over periods of weeks, months or years. Such injury or disorder may include damage to the blood circulatory system, damage to the nervous system, damage to joints and possibly damage to other body structures.

If numbness, tingling, pain, clumsiness, weakened grip, whitening of the skin or other symptoms occur at any time, when operating or not operating the machine, do not resume operation of the machine, but seek medical attention. Continued use of the machine after the occurrence of any such symptom may increase the risk of symptoms becoming more severe and/or permanent.

WARNING

Never hold hand or fingers on moving machine parts or tools. Moving tools or parts of the tool holder have, when touched, very high levels of vibration.

These vibrations values have been measured and we have obtained the following results:

Note! On the moving tool and at recommended speed: 5.000-7.000 rpm the vibration values are very high. At stroke length 1 mm, approx. 20-28 m/s², at stroke length 2 mm approx. 35-50 m/s² and at stroke length 3 mm approx. 55-75 m/s².

CAUTION

As an accessory to the tool holder we will offer a Diprofil Protective Finger sleeve. For the Ø 6,4 mm Tool holder the Item No. is PFS-6,4 and for the Ø 3,5mm Tool holder the Item No. is PFS-3,5.

When using and holding the fingers on a Diprofil Protective Finger sleeve together with Diprofil Classic machines with Ø 6,4 mm tool-holder and a tool-weight of 18 gram at a speed of 6.000 to 7.000 rpm the vibration level is approx. 4 to 5 m/s² at stroke 1 mm, approx. 7 to 8 m/s² at stroke length 2 mm and approx. 9 to 11 m/s² at stroke length 3mm measured at the actual finger sleeve. The corresponding values for the Ø 3.5 mm tool-holder are about 1 m/s² lower than for the Ø 6,4 mm tool-holder.

By using the Diprofil Protective Finger sleeve the vibration levels can actually be reduced with about 80% compared to holding your hand or fingers directly on the moving tool or tool-holder parts.

To keep the vibrations as low as possible it is also of utmost importance to work as parallel as possible in reference to the surface on which the machine and tool will be used. Flexible tools as Fibre Stones or articulated tools as Ball-rods together with Lapping Bits and similar generate less vibration than hard tools (not flexible tools) as Polishing Stones, Diamond files, etc. For more information we refer to our website: www.diprofil.se

Let the tool do the job. Use minimum possible hand grip consistently with proper control for safe operation.

Note! For information about vibrations and the responsibilities of the manufacturer, the employer and the operator respectively please see the Vibration Declaration Statement on page 24-33.

Here you will also find references to different websites with information on vibrations/ working environment as well as standards and demands from institutions and authorities in certain countries.

ADDITIONAL SAFETY INSTRUCTIONS

- **Machines and accessories must only be used for their intended purpose.**
- **Only qualified and trained persons may operate or maintain the machine.**
- **The maximum permissible machine using data must not be exceeded.**

DIPROFIL CLASSIC MACHINES WITH TOOL HOLDER Ø 3,5 mm

A. FLEXIBLE SHAFT-DRIVEN MACHINE

Type FPB/R and FPC/R

B. AIR DRIVEN MACHINE

Type FPD/R

C. MICRO MOTOR-DRIVEN MACHINES

Type FPP/R and FPP/ERJ

D. MACHINES WITH MICRO MOTOR CONNECTION

Type FPV/DR, FPV/GR, FPV/ER and FPV/NR

Package includes:

1 x Classic polishing/filing machine

1 x Bottle of lubrication oil type FNA-K

1 x 3 mm hexagon-key

2 x FPP-59 spare lubricating felts


TECHNICAL DATA - Ø 3,5 mm

A. FLEXIBLE SHAFT-DRIVEN MACHINES

Type FPB/R AND FPC/R

TECHNICAL DATA

Driving:	These models are driven by an electrical motor with speed control and a flexible shaft with slip-joint (European standard) or ball-joint connection (US standard) e.g. Diprofil type DSE-47. Corresponding motors of other brands may also be used.
Speed (maximum):	8.000 rpm.
Speed (recommended):	5.000 – 7.000 rpm (depending on the weight of the used tool). For tools weighing more than 15 g a speed of max. 6000 rpm is recommended.
Stroke length:	0 – 6 mm.
Stroke length (recommended):	0,5 – 3 mm. For tools weighing more than 15 g a stroke length of max. 2 mm is recommended.
Tool holder:	Ø 3,5 mm.
Weight of inserted tool:	Maximum: 26 g. Recommended: 1-15 g.
Applied feed force:	Between: 4N ± 2N to 10N ± 2N. Depending on inserted tool type and dimension.
Machine weight:	Approx. 600 g.
Noise level:	Not exceeding 70 dB(A) at 7.000 rpm.
Vibration levels:	Approx. 2,5 - 10 m/s ² when the machine is operated according to this operation guide. Please also see the diagrams on page 25 for measured vibration levels at certain speeds and tool weights.


 **Warning:** Frequency weighed hand/arm vibration principally in accordance with ISO 28927-8. Part 8: Polishing and filing machines with reciprocating action.

B. AIR-DRIVEN MACHINES

Type FPD/R

TECHNICAL DATA


Driving:	This model is driven by compressed and oil mist lubricated air. PLEASE NOTE! The built-in air-motor may be damaged, if operated with un-lubricated air.
Connection:	The Diprofil quick-coupling HSL-M and fog lubrication unit MFB should be used for connection to your compressed air system. PLEASE NOTE! Protect the air inlet from dust and dirt, when not in operation.
Oil consumption:	Minimum 30mm ³ /min. at maximum speed (about 2 drops/min.)
Air pressure:	4 bar (57 psi).
Air consumption:	Approx. 65 l/min at 8.000 rpm.
Speed (maximum):	8.000 rpm.
Speed (recommended):	5.000 – 7.000 rpm (depending on the weight of the used tool). For tools weighing more than 15 g a speed of max. 6000 rpm is recommended.
Stroke length:	0 – 6 mm.
Stroke length (recommended):	0,5 – 3 mm. For tools weighing more than 15 g a stroke length of max. 2 mm is recommended.
Tool-holder:	Ø 3,5 mm.
Weight of inserted tool:	Maximum: 26 g. Recommended: 1-15 g

Applied feed force:	Between: $4\text{N} \pm 2\text{N}$ to $10\text{N} \pm 2\text{N}$. Depending on inserted tool type and dimension.
Machine weight:	Approx. 770 g.
Noise level:	Not exceeding 70 dB(A) at 7.000 rpm.
Vibration levels:	Approx. $2,5 - 10 \text{ m/s}^2$, when the machine is operated according to this operation guide. Please also see the diagrams on page 25 for measured vibration levels at certain speeds and tool weights.
 Warning:	Frequency weighed hand/arm vibration principally in accordance with ISO 28927-8. Part 8: Polishing and filing machines with reciprocating action.

C. MICRO MOTOR-DRIVEN MACHINES

Type FPP/R (Diprofil connector) and FPP/ERJ (Eneska 3-1 connector)

TECHNICAL DATA


Driving:	These models are driven by a built-in micro-motor, which is connected to, and controlled by, the DIPROFIL DPU-3, TPU-20 or corresponding power unit. Output: DC 0-32V.
Speed (maximum):	7.000 rpm.
Speed (recommended):	5.000 – 7.000 rpm (depending on the weight of the used tool). For tools weighing more than 15 g a speed of max. 6000 rpm is recommended.
Stroke length:	0 – 6 mm.
Stroke length (recommended):	0,5 – 3 mm. For tools weighing more than 15 g a stroke length of max. 2 mm is recommended.
Tool-holder:	Ø 3,5 mm.
Weight of inserted tool:	Maximum: 26 g. Recommended: 1-15 g
Applied feed force:	Between: $4\text{N} \pm 2\text{N}$ to $10\text{N} \pm 2\text{N}$. Depending on inserted tool type and dimension.
Machine weight:	Approx. 820 g.
Noise level:	Not exceeding 70 dB(A) at 7.000 rpm.
Vibration levels:	Approx. $2,5 - 10 \text{ m/s}^2$, when the machine is operated according to this operation guide. Please also see the diagrams on page 25 for measured vibration levels at certain speeds and tool weights.
 Warning:	Frequency weighed hand/arm vibration principally in accordance with ISO 28927-8. Part 8: Polishing and filing machines with reciprocating action.

D. MACHINES WITH MICRO MOTOR CONNECTION

Type FPPV/DR (for Diprofil), FPPV/GR (for Argofile, Gesswein and Uhandy), FPPV/ER (for Eneska 4-1 and NSK ESPERT) and FPPV/NR (for Eneska 3-1, 3-2 and NSK EMax-Evolution)

TECHNICAL DATA

Driving:	These models should be driven by motors with low rpm and high torque only. Exceptions can be made for motors with high torque from very low rpm, as e.g. Diprofil motor HPM-BL1 brushless motor for Power Unit TPU-20 or corresponding power unit. Output: BL DC 0-32V or DC 0-32V.
Speed (maximum):	7.000 rpm.
Speed (recommended):	5.000 – 7.000 rpm (depending on the weight of the used tool). For tools weighing more than 15 g a speed of max. 6000 rpm is recommended.

Stroke length:	0 – 6 mm.
Stroke length (recommended):	0,5 – 3 mm. For tools weighing more than 15 g a stroke length of max. 2 mm is recommended.
Tool-holder:	Ø 3,5 mm.
Weight of inserted tool:	Maximum: 26 g. Recommended: 1-15 g.
Applied feed force:	Between: 4N ± 2N to 10N ± 2N. Depending on inserted tool type and dimension.
Machine weight:	Approx. 780 g depending on motor type.
Noise level:	Not exceeding 70 dB(A) at 7.000 rpm.
Vibration levels:	Approx. 2,5 - 10 m/s ² , when the machine is operated according to this operation guide. Please also see the diagrams on page 25 for measured vibration levels at certain speeds and tool weights.
 Warning:	Frequency weighed hand/arm vibration principally in accordance with ISO 28927-8. Part 8: Polishing and filing machines with reciprocating action.

OPERATION GUIDE - Ø 3,5 mm

GENERAL OPERATING INSTRUCTIONS

FIXATION OF TOOLS:

Place the tool in the tool-holder locking it with the screw (FNA-23). See Fig. 1.

STEERING BLOCK:

The tool-holder may be used in both a locked and a swiveling mode. To release the guide block (FMP-4): Loosen the locking pin (FNA-13), pull out the steering block approx. 3 mm and tighten it with the locking pin in its new position. See Fig. 2.

FIG 1

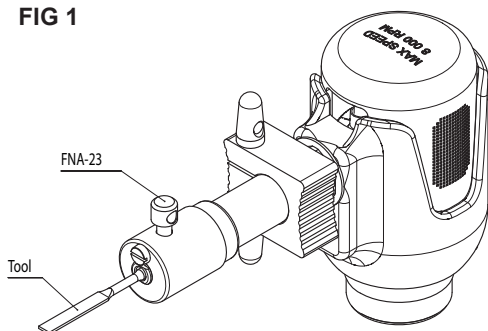
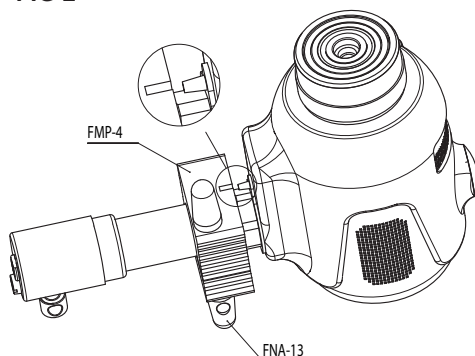


FIG 2

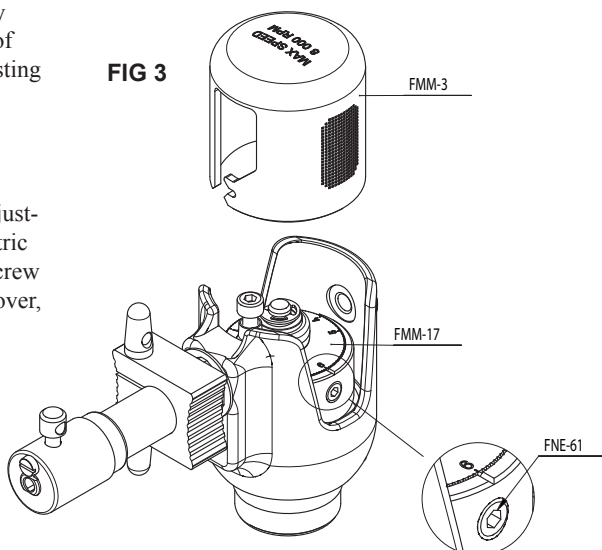


STROKE LENGTH ADJUSTMENT:

1. To avoid that the machine is started by mistake the machine must be put out of operation in a secure way before adjusting the stroke length.
2. Remove the machine cover (FMM-3).
3. Loosen the screw (FNE-61) on the adjustable eccentric FMM-17, set the eccentric part in its new position and lock the screw (FNE-61). Reassemble the machine cover, where- after the work may be started.

See Fig. 3.

FIG 3



SERVICE AND MAINTENANCE

Regular maintenance is a prerequisite for keeping the machine safe and effective. Carefully follow the operating instructions as well as the daily and weekly lubrication instruction. Exchange worn parts, like tool holder, ball bearings, etc. Worn parts increases the vibration levels in the machine.

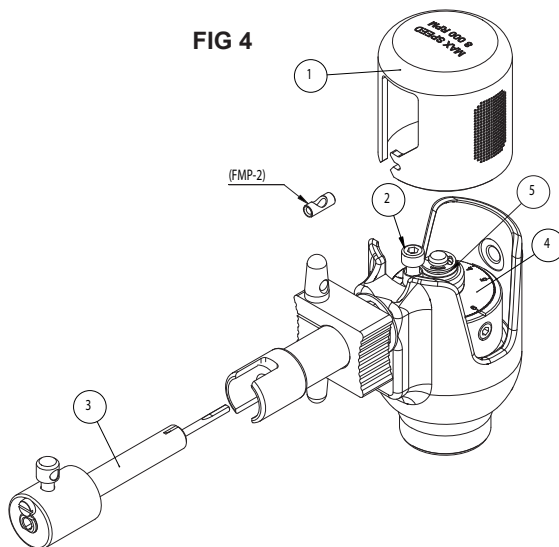
For maximum functionality and lifetime of your machine the following guidelines should be followed as closely as possible.

DAILY MAINTENANCE:

The below procedure should be carried out approximately every 8 hours of operation.

1. Remove the Machine cover (1).
2. Apply a few drops of lubrication oil, type Diprofil FNA-K or equivalent, to the needle bearing in the linkage (5) approximately every 8 hours of usage.
3. Loosen the connecting rod screw (2). (Please, make sure not to loosen it too much, as this will cause the connecting rod bushing (FMP-2) to fall out of the linkage.)
4. Release the piston rod and tool holder (3) by sliding it out of the machine housing.
5. Clean the piston rod and tool holder (3) carefully with a soft cloth and apply a few drops of lubrication oil, type Diprofil FNA-K or equivalent.
6. Reassemble the piston rod and tool holder (3) into the machine housing, making sure that the piston rod goes all the way to the bottom of the linkage (the adjustable eccentric (4) needs to be in its forward position). Lock it with the connecting rod screw (2).
7. Reassemble the Machine cover (1).

See Fig. 4.

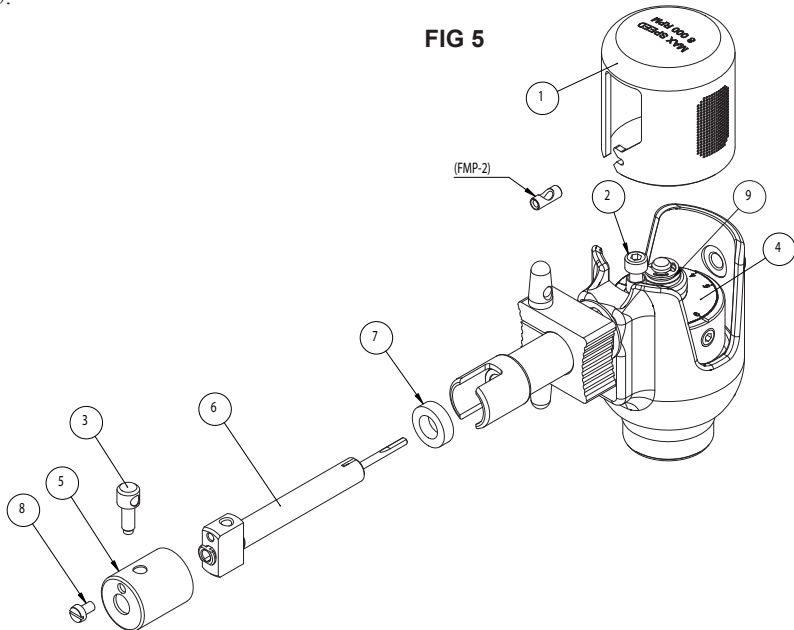


WEEKLY MAINTENANCE:

The below procedure should be carried out approximately every 30 hours of operation.

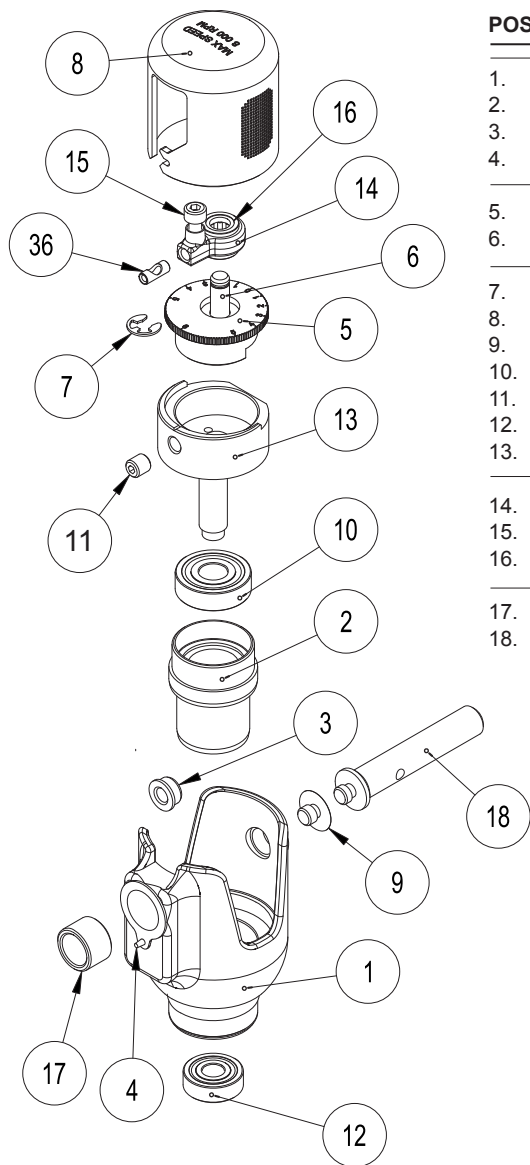
1. Remove the machine cover (1).
2. Apply a few drops of lubrication oil, type Diprofil FNA-K or equivalent, to the needle bearing in the linkage (9).
3. Remove the tightening screw (3).
4. Remove the screw (8).
5. Disassemble the tool-holder cap (5).
6. Loosen the connecting rod screw (2).
7. Release the piston rod and tool holder (6) by sliding it out of the machine housing.
8. Clean the piston rod and tool holder (6) and the tool holder cap (5) carefully with some kind of detergent (e.g. CRC 5-56 or WD 40) and apply a few drops of lubrication oil, type Diprofil FNA-K or equivalent.
9. Remove and clean the lubricating felt (7) carefully with some kind of detergent. Drench it in oil, type Diprofil FNA-K or equivalent, and then put it back in its original position. Note: If it is very dirty, replace it with a new one.
10. Reassemble the tool holder cap (5) and fasten it by means of the screw (8).
11. Reassemble the tightening screw (3).
12. Reassemble the piston rod and tool holder (6) into the machine housing making sure that the piston rod goes all the way to the bottom of the linkage (the adjustable eccentric (4) needs to be in its forward position). Lock it with the connecting rod screw (2).
13. Reassemble the machine cover (1).

See Fig. 5.



PARTS DRAWING - Ø 3,5 mm

FPM-G - POLISHING/FILING MACHINE HOUSING



POS.	ITEM NO.	DESCRIPTION	SUB. ASSY. NO.
1.	FPM-3	Housing	
2.	FPM-2	Bushing	
3.	FNB-2	Steel bushing	FPM-A
4.	FNA-25	Pin	
5.	FMM-17	Adjustable eccentric	
6.	FMM-18	Cylinder pin	FMM-K
7.	FNE-47	Circlip	
8.	FMM-3	Machine cover	
9.	FNA-30	Screw	
10.	44029	Ball bearing	
11.	FNE-61	Locking screw	
12.	44030	Ball bearing	
13.	FPM-1	Main spindle	
14.	FNH-11	Linkage	
15.	42053	Screw for connecting rod	FNH-L
16.	FNE-102	Needle bearing	
17.	FMP-1	Bushing	
18.	FNA-31	Machine holder (accessory)	

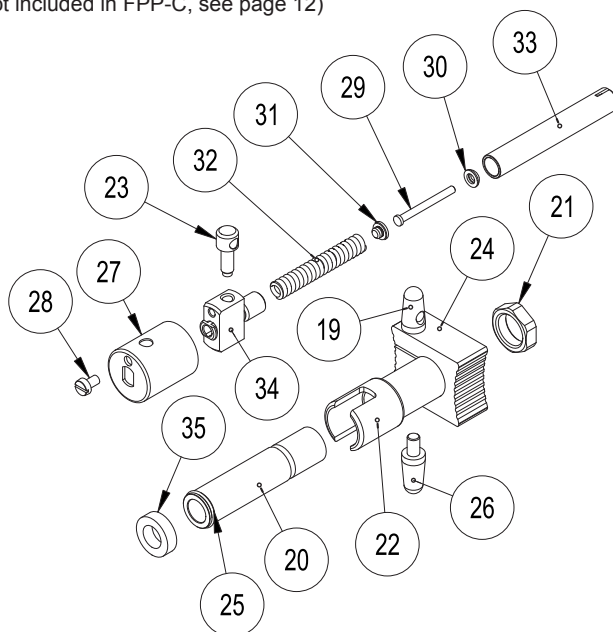
For other Spare Parts we refer to our website: www.diprofil.se

FPP-C - TOOL-HOLDER Ø 3,5 mm

POS.	ITEM NO.	DESCRIPTION	SUB. ASSY. NO.
19.	FNA-13	Locking pin for guide block	
20.	FNA-20	Supporting sleeve	
21.	FNA-21	Retaining nut	
22.	FNA-22	Guide sleeve	
23.	FNA-23	Tightening screw	
24.	FMP-4	Guide block	
25.	FNA-29	Lock ring	
26.	FNA-35	Guide peg	
27.	FNA-38	Tool-holder cap	
28.	FNA-62	Screw	
29.	FNE-14	Connecting rod	
30.	FNA-15	Semi spherical washer	
31.	FNA-16	Spring insert	
32.	FNA-17	Spring	FPP-G
33.	FNA-18	Plunger	
34.	FPP-19	Tool-holder	
35.	FPP-59	Lubricating felt	

36. FMP-2 Bushing

(To be ordered separately. Not included in FPP-C, see page 12)



DIPROFIL CLASSIC MACHINES WITH TOOL HOLDER Ø 6,4 mm

A. FLEXIBLE SHAFT-DRIVEN MACHINE

Type FPK/R, FPK/RL, FPS/R, FPS/RL, FPH/R and FPH/RL

B. AIR DRIVEN MACHINE

Type FPL/R and FPL/RL

C. MICRO MOTOR-DRIVEN MACHINES

Type FPM/R, FPM/RL, FPM/ERJ and FPM/ERLJ

D. MACHINES WITH MICRO MOTOR CONNECTION

Type FPT/DR, FPT/DRL, FPT/GR, FPT/GRL, FPT/ER, FPT/ERL, FPT/NR and FPT/NRL

Package includes:

1 x Classic polishing/filing machine

1 x Bottle of lubrication oil type FNA-K

1 x 3 mm hexagon-key

2 x FNH-59 spare lubricating felts

TECHNICAL DATA - Ø 6,4 mm

A. FLEXIBLE SHAFT-DRIVEN MACHINES

Type FPK/R, FPK/RL, FPS/R, FPS/RL, FPH/R, FPH/RL

TECHNICAL DATA

Driving:

These models are driven by an electrical motor with speed control and a flexible shaft with slip-joint (European standard) or ball-joint connection (US standard) e.g. Diprofil type DSE-47. Corresponding motors of other brands may also be used.

Speed (maximum):

8.000 rpm.

Speed (recommended):

5.000 – 7.000 rpm (depending on the weight of the used tool). For tools weighing more than 15 g a speed of max. 6000 rpm is recommended.

Stroke length:

0 – 6 mm.

Stroke length (recommended):

0,5 - 3 mm. For tools weighing more than 15 g a stroke length of max. 2 mm is recommended.

Tool holder:

Ø 6,4 mm.

Weight of inserted tool:

Maximum: 26 g. **Recommended: 1-15 g.**

Applied feed force:

Between: 4N ± 2N to 10N ± 2N. Depending on inserted tool type and dimension.

Machine weight:

Approx. 615--770 g. depending on model.

Noise level:

Not exceeding 70 dB(A) at 7.000 rpm.

Vibration levels:

Approx. 3 - 12 m/s² when the machine is operated according to this operation guide. **Please also see the diagrams on page 26 for measured vibration levels at certain speeds and tool weights.**



Warning:

Frequency weighed hand/arm vibration principally in accordance with ISO 28927-8. Part 8: Polishing and filing machines with reciprocating action.

B. AIR-DRIVEN MACHINES

Type FPL/R and FPL/RL

TECHNICAL DATA

Driving:

These models are driven by compressed and oil mist lubricated air.

PLEASE NOTE! The built-in air-motor may be damaged, if operated with un-lubricated air.

Connection:

The Diprofil quick-coupling HSL-M and fog lubrication unit MFB should be used for connection to your compressed air system. PLEASE NOTE! Protect the air inlet from dust and dirt, when not in operation.

Oil consumption:

Minimum 30mm³/min at maximum speed (about 2 drops/min.)

Air pressure:

4bar (58psi).

Air consumption:

Approx. 65 l/min at 8. 000 rpm.

Speed (maximum):

8.000 rpm.

Speed (recommended):

5.000 – 7.000 rpm (depending on the weight of the used tool). For tools weighing more than 15 g a speed of max. 6000 rpm is recommended.

Stroke length:

0 – 6mm.

Stroke length (recommended):


0,5 - 3 mm. For tools weighing more than 15 g a stroke length of max. 2 mm is recommended.

Tool-holder:

Ø 6,4 mm.

Weight of inserted tool:


Maximum: 26 g. **Recommended: 1-15 g.**

Applied feed force:	Between: $4\text{N} \pm 2\text{N}$ to $10\text{N} \pm 2\text{N}$. Depending on inserted tool type and dimension.
Machine weight:	Approx. 780-910 g. depending on model.
Noise level:	Not exceeding 70 dB(A) at 7.000 rpm.
Vibration levels:	Approx. $3 - 12 \text{ m/s}^2$ when the machine is operated according to this operation guide. Please also see the diagrams on page 26 for measured vibration levels at certain speeds and tool weights.
 Warning:	Frequency weighed hand/arm vibration principally in accordance with ISO 28927-8. Part 8: Polishing and filing machines with reciprocating action.

C. MICRO MOTOR-DRIVEN MACHINES

Type FPM/R, FPM/RL (Diprofil connector) and FPM/ERJ, FPM/ERLJ (Eneska 3-1 connector)

TECHNICAL DATA


Driving:	These models are driven by a built-in micro-motor, which is connected to, and controlled by, the DIPROFIL DPU-3, TPU-20 or corresponding power unit. Output: DC 0-32V.
Speed (maximum):	approx. 7.000 rpm.
Speed (recommended):	5.000 – 7.000 rpm (depending on the weight of the used tool). For tools weighing more than 15 g a speed of max. 6000 rpm is recommended.
Stroke length:	0 – 6 mm.
Stroke length (recommended):	0,5 - 3 mm. For tools weighing more than 15 g a stroke length of max. 2 mm is recommended.
Tool-holder:	Ø 6,4 mm.
Weight of inserted tool:	Maximum: 26 g. Recommended: 1-15 g.
Applied feed force:	Between: $4\text{N} \pm 2\text{N}$ to $10\text{N} \pm 2\text{N}$. Depending on inserted tool type and dimension.
Machine weight:	Approx. 830-960 g. depending on model.
Noise level:	Not exceeding 70 dB(A) at 7.000 rpm.
Vibration levels:	Approx. $3 - 12 \text{ m/s}^2$ when the machine is operated according to this operation guide. Please also see the diagrams on page 26 for measured vibration levels at certain speeds and tool weights.
 Warning:	Frequency weighed hand/arm vibration principally in accordance with ISO 28927-8. Part 8: Polishing and filing machines with reciprocating action.

D. MACHINES WITH MICRO MOTOR CONNECTION

Type FPT/DR, FPT/DRL (for Diprofil), FPT/GR, FPT/GRL (for Argofile, Gesswein and Uhandy), FPT/ER, FPT/ERL (for Eneska 4-1 and NSK ESPERT) and FPT/NR, FPT/NRL (for Eneska 3-1, 3-2 and NSK EMax-Evolution)

TECHNICAL DATA

Driving:	These models should be driven by motors with low rpm and high torque only. Exceptions can be made for motors with high torque from very low rpm, as e.g. Diprofil motor HPM-BL1 brushless motor for Power Unit TPU-20 or corresponding power unit.
Speed (maximum):	Output: BL DC 0-32V or DC 0-32V.
Speed (recommended):	Approx. 7.000-8.000 rpm. 5.000 – 7.000 rpm (depending on the weight of the used tool). For tools weighing more than 15 g a speed of max. 6000 rpm is recommended.

Stroke length:	0 – 6 mm.
Stroke length (recommended):	0,5 - 3 mm. For tools weighing more than 15 g a stroke length of max. 2 mm is recommended.
Tool-holder:	Ø 6,4 mm.
Weight of inserted tool:	Maximum: 26 g. Recommended: 1-15 g.
Applied feed force:	Between: 4N ± 2N to 10N ± 2N. Depending on inserted tool type and dimension.
Machine weight:	Approx. 750-820 g. depending on motor type.
Noise level:	Not exceeding 70 dB(A) at 7.000 rpm.
Vibration levels:	Approx. 3 - 12 m/s ² when the machine is operated according to this operation guide. Please also see the diagrams on page 26 for measured vibration levels at certain speeds and tool weights.
 Warning:	Frequency weighed hand/arm vibration principally in accordance with ISO 28927-8. Part 8: Polishing and filing machines with reciprocating action.

OPERATION GUIDE - Ø 6,4 mm

GENERAL OPERATING INSTRUCTIONS:

FIXATION OF TOOLS:

Place the tool in the tool-holder locking it with the screw (FNH-23). See Fig. 7.

STEERING BLOCK:

The tool-holder may be used in both a locked and a swiveling mode. To release the guide block (FNH-27): Loosen the locking pin (FNA-13), pull out the steering block approx. 3mm and tighten it with the locking pin in its new position. See Fig. 8.

FIG 7

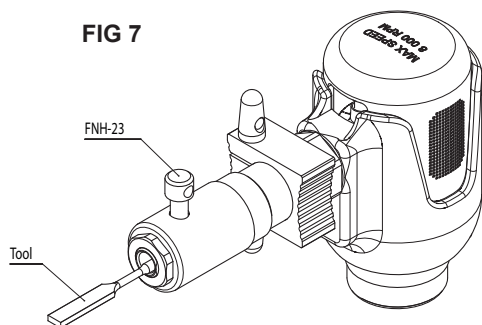
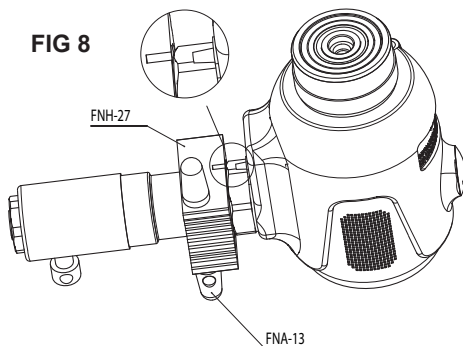


FIG 8

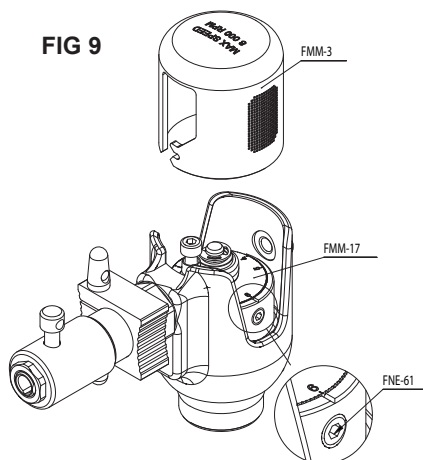


STROKE LENGTH ADJUSTMENT:

1. To avoid that the machine is started by mistake the machine must be put out of operation in a secure way before adjusting the stroke length.
2. Remove the machine cover (FMM-3).
3. Loosen the screw (FNE-61) on the adjustable eccentric FMM-17, set the eccentric part in its new position and lock the screw (FNE-61). Reassemble the machine cover, where- after the work may be started.

See Fig. 9.

FIG 9



SERVICE AND MAINTENANCE

Regular maintenance is a prerequisite for keeping the machine safe and effective. Carefully follow the operating instructions as well as the daily and weekly lubrication instruction.

Exchange worn parts, like tool holder, ball bearings, etc.

Worn parts increases the vibration levels in the machine.

For maximum functionality and lifetime of your machine the following guidelines should be followed as closely as possible.

DAILY MAINTENANCE:

The below procedure should be carried out approximately every 8 hours of operation.

1. Remove the Machine cover (1).
2. Apply a few drops of lubrication oil, type Diprofil FNA-K or equivalent, to the needle bearing in the linkage (5) approximately every 8 hours of usage.
3. Loosen the connecting rod screw (2).
4. Release the piston rod and tool holder (3) by sliding it out of the machine housing.
5. Clean the piston rod and tool holder (3) carefully with a soft cloth and apply a few drops of lubrication oil, type Diprofil FNA-K or equivalent.
6. Reassemble the piston rod and tool holder (3) into the machine housing, making sure that the piston rod goes all the way to the bottom of the linkage. The adjustable eccentric (4) needs to be in its forward position).
- Lock it with the connecting rod screw (2).
7. Reassemble the machine cover (1).

See Fig. 10.

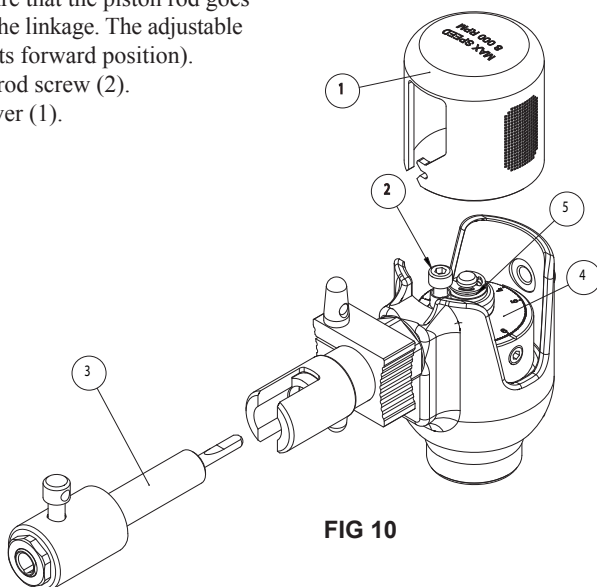


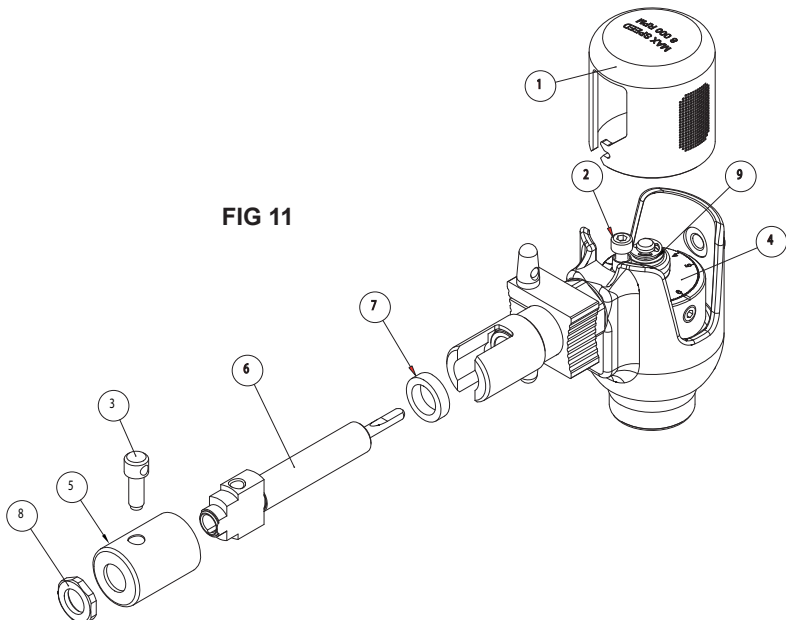
FIG 10

WEEKLY MAINTENANCE:

The below procedure should be carried out approximately every 30 hours of operation.

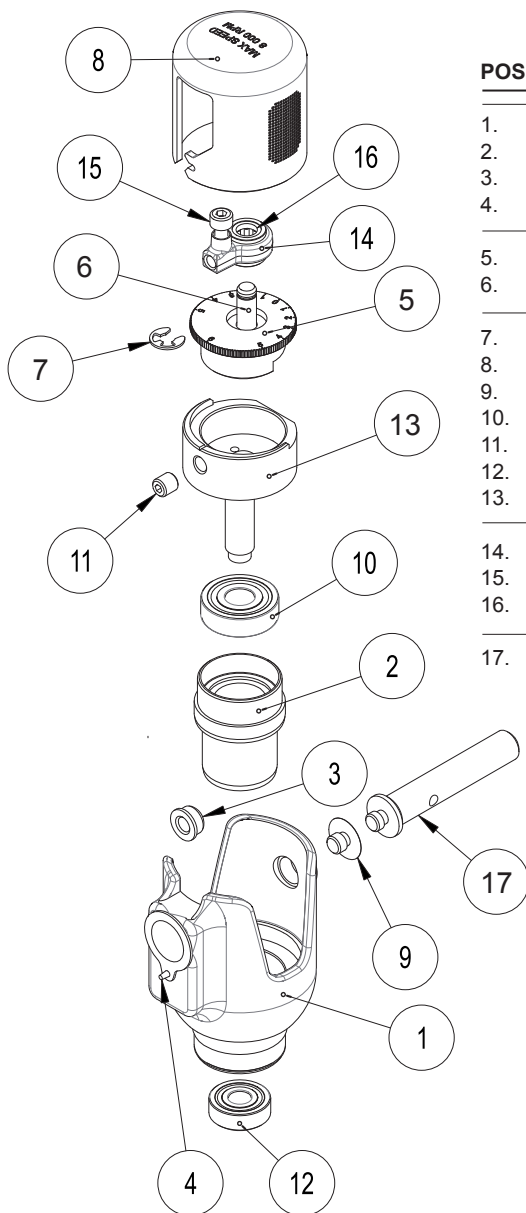
1. Remove the machine cover (1).
2. Apply a few drops of lubrication oil, type Diprofil FNA-K or equivalent, to the needle bearing in the linkage (9).
3. Remove the tightening screw (3).
4. Remove the nut (8).
5. Disassemble the tool-holder cap (5).
6. Loosen the connecting rod screw (2).
7. Release the piston rod and tool holder (6) by sliding it out of the machine housing.
8. Clean the piston rod and tool holder (6) and the tool holder cap (5) carefully with some kind of detergent (e.g. CRC 5-56 or WD 40) and apply a few drops of lubrication oil, type Diprofil FNA-K or equivalent.
9. Remove and clean the lubricating felt (7) carefully with some kind of detergent. Drench it in oil, type Diprofil FNA-K or equivalent, and then put it back in its original position. Note: If it is very dirty, replace it with a new one.
10. Reassemble the tool holder cap (5) and fasten it by means of the nut (8).
11. Reassemble the tightening screw (3).
12. Reassemble the piston rod and tool holder (6) into the machine housing making sure that the piston rod goes all the way to the bottom of the linkage (the adjustable eccentric (4) needs to be in its forward position). Lock it with the connecting rod screw (2).
13. Reassemble the machine cover (1).

See Fig. 11.



PARTS DRAWING - Ø 6,4 mm

FPM-G - POLISHING/FILING MACHINE HOUSING



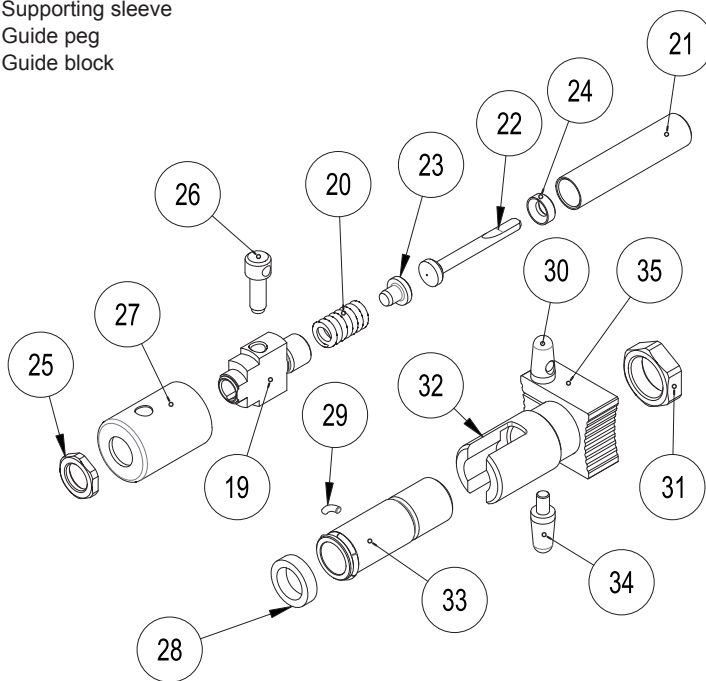
POS.	ITEM NO.	DESCRIPTION	SUB. ASSY. NO.
1.	FPM-3	Housing	FPM-A
2.	FPM-2	Bushing	
3.	FNB-2	Steel bushing	
4.	FNA-25	Pin	
5.	FMM-17	Adjustable eccentric	FMM-K
6.	FMM-18	Cylinder pin	
7.	FNE-47	Circlip	
8.	FMM-3	Machine cover	
9.	FNA-30	Screw	
10.	44029	Ball bearing	
11.	FNE-61	Locking screw	
12.	44030	Ball bearing	
13.	FPM-1	Main spindle	
14.	FNH-11	Linkage	FNH-L
15.	42053	Screw for connecting rod	
16.	FNE-102	Needle bearing	
17.	FNA-31	Machine holder (accessory)	

For other spare-parts for i.e. the different connections and the long tool-holder we refer to our website: www.dipofil.se

FMM-C - TOOL-HOLDER Ø 6,4 mm

POS.	ITEM NO.	DESCRIPTION	SUB. ASSY. NO.
19.	FNH-19	Tool-holder	
20.	FNH-17	Spring	
21.	FNH-18	Plunger	
22.	FNH-14	Connecting rod	
23.	FNH-16	Spring insert	
24.	FPM-4	Bearing plate	FNH-G

25.	FNH-37	Nut
26.	FNH-23	Tightening screw
27.	FNH-38	Tool-holder cap
28.	FNH-59	Lubricating felt
29.	FNH-29	Lock segment
30.	FNA-13	Lock pin for guide block
31.	FNH-21	Retaining nut
32.	FNH-22	Guide sleeve
33.	FNH-20A	Supporting sleeve
34.	FNA-35	Guide peg
35.	FNH-27	Guide block



VIBRATION DECLARATION STATEMENT

GENERAL INFORMATION:

Reciprocating machines like the Diprofil Classic Machines or similar all generate potentially harmful vibrations to different extents.

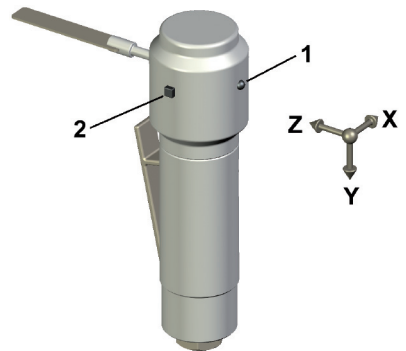
The following factors all affect the level of unwanted and potentially harmful vibrations transmitted to the hand of the operator.

1. **The speed (number of strokes / minute).** This is the factor which has the biggest affect on the vibration levels and when operating the machine, it should not be used at speed levels higher than required. (See machine data).
2. **The stroke length. The stroke length should be kept as short as possible** and adapted to the application.
3. **The weight of the used inserted tool. The heavier the tool the higher levels of unwanted vibrations.** Using a heavier tool normally means that the speed and the stroke length must be reduced.
4. **The angle in which the machine (working tool) is held against the working surface and the tool type:** To keep the vibrations as low as possible it is also of utmost importance to work as parallel as possible in reference to the surface on which the machine and tool will be used. Flexible tools as Fibre Stones or articulated tools as Ball-rods together with Lapping Bits and similar generate less vibration than hard tools (not flexible tools) as Polishing Stones, Diamond files, etc. Also see page 3.
5. **Never hold hand or fingers on moving machine parts or tools (see page 3.)**

VIBRATION MEASUREMENTS:

Please, find diagram 1 and 2 on the following pages, showing measured vibration levels using certain tools at different speeds and stroke lengths. **All measurements have been made in accordance with ISO 28927-8:2009. Part 8: Saws and polishing and filing machines with reciprocating action and small saws with oscillating or rotating action.**

Our tests have been performed with machines and different tools using certain variable data (**results – see the 2 different diagrams**). We have as far as possible tried to imitate normal polishing and filing situations.



The declared values were obtained by laboratory type testing in accordance with the stated directive and standards and are suitable for comparison with the declared values of other tools, tested in accordance with the same directive or standards.

Location of measurement: 1 is prescribed location and 2 is second location.

The declared values are not adequate for use in risk assessments and values measured in individual work places may be higher. The actual exposure values and risk of harm experienced by an individual user are unique and depend upon the user’s way of working, in what material the machine is used as well as upon the exposure time, the physical condition of the user and the condition of the machine.

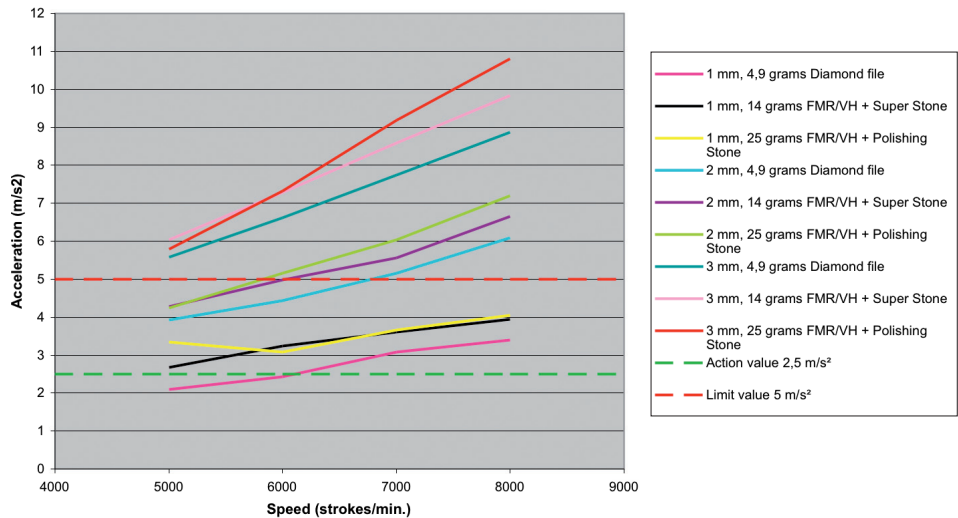
Diamantprodukt AB, cannot be held responsible for the consequences of using the declared values instead of values reflecting the actual exposure in an individual risk assessment and in a work place situation, which is out of our control.

DIPROFIL CLASSIC MACHINES WITH TOOL HOLDER Ø 3,5 mm

The uncertainty value, K, represents the uncertainty of the declared vibration emission value, a_{hd} , and is intended to compensate for different batches, production variations etc. It is expressed in m/s^2 .

For the Classic Machines with tool holder Ø 3,5 mm the K-value is 1,01.

Vibrations diagram Classic Polishing-/Filing machine 3,5 mm tool-holder

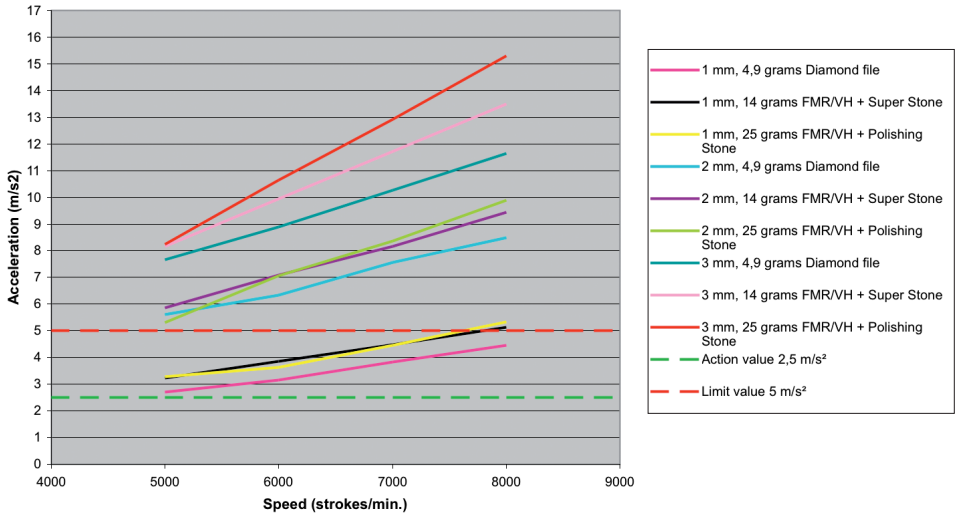


DIPROFIL CLASSIC MACHINES WITH TOOL HOLDER Ø 6,4 mm

The uncertainty value, K, represents the uncertainty of the declared vibration emission value, a_{hd} , and is intended to compensate for different batches, production variations etc. It is expressed in m/s^2 .

For Classic Machines with tool holder Ø 6,4 mm the K-value is 1,19.

Vibrations diagram Classic Polishing-/Filing machine 6,4 mm tool-holder



ADDITIONAL VIBRATION INFORMATION

This power tool may cause hand-arm vibration syndrome, if not adequately used.

This additional vibration information may be of assistance to employers in meeting their obligations e.g. under national law or regulations based on the EU directive 2002/44/EC, to assess the risks to their workers arising from hand-arm vibration exposure associated with the use of this machine.

VIBRATIONS AND THE ISSUE OF HAVS (HAND ARM VIBRATION SYNDROME)

- The EU directive (2002/44/EC), concerning vibration exposure, was approved by the member states and EU parliament in July 6, 2002 and should have been introduced into national laws not later than by July 6, 2005.
- Minimizing the vibration exposure is the responsibility of the manufacturer, the vendor, the employer and the operator respectively.
- When using machines resulting in an exposure exceeding $2,5 \text{ m/s}^2$ it is the responsibility of the employer to make an action plan on how to minimize the vibration exposure for the operators. This also includes regular scheduled health inspections.
- Vibrations emission exceeding $2,5 \text{ m/s}^2$ limits the time of operation.

CLASSIFICATION OF INJURY RISKS (ACCORDING TO SWEDISH INSTITUTE OF INDUSTRIAL RESEARCH)

MAXIMUM DAILY EXPOSURE	PROCESS VIBRATIONS IN m/s^2
8 HOURS (FULL WORKING DAY)	BELOW 2,5
4 HOURS	2,6-3,5
2 HOURS	3,6-4,9
1 HOUR	5,0-7,0
30 MINUTES	7,1-9,9
15 MINUTES	10,0-14,0
7,5 MINUTES	14,1-19,8
BELOW 7,5 MINUTES	ABOVE 19,9

The risk for injuries such as “white fingers” is estimated to be less than 14%, if the stated recommendations are followed. This is presuming that the total time of exposure, in regular use and for the specific individual, is max. 10 years. If the exposure continues over a longer period of time, the risk of injuries increases, i.e. after 15 years of daily exposure the risk for injuries is estimated to be max. 30%, if the recommendations are followed.

We recommend a programme of health surveillance to detect early symptoms, which may be related to vibration exposure, making it possible to modify management procedures in order to prevent significant disability.

The Diprofil Classic machine is based on reliable technology from the 1950's. Based on today's demands it may be less suitable for long-time continuous use, because of the potentially harmful vibrations transmitted to the operator.

To take advantage of the latest technologies in this field it is recommended to use the low vibrating "Di-Pro Machines". With extremely low vibration levels these machines are perfect for continuous use during long working hours. Please find some more information below.

***DI-PRO* MAXIMUM EFFICIENCY – MINIMAL VIBRATIONS**

If vibrations and working hours exceed the table above we recommend that you use Diprofil's Di-Pro machines with low vibrations. If these machines are used according to the recommendations in the operation guide they normally have vibration levels below 2,5 m/s². This means that an operator may work up to 8-hours a day with a minimized risk of sustaining vibration generated injuries.

For further information, we recommend you to visit our website www.diprofil.se , consult us by phone or e-mail or contact your local supplier.

THE NEW MACHINERY DIRECTIVE 2006/42/EC, VALID IN THE EU AS OF 2009-12-29.

A SUMMARY

The directive was approved by the member states and the EU and the EU parliament on May 17, 2006. This directive must be active as a national law no later than December 29, 2009.

On December 29, 2009 the new Machinery Directive, 2006/42/EC replaced the old directive 98/37/EC. From December 29, 2009, vibration emission must be declared as total values out of 3-axis values (x-y-z) in order to address the essential requirement 2.2.1.1 in Annex1 of the new Machinery Directive, 2006/42/EC. The new values should be measured according to revised or new vibration emission standards and they will differ from, and normally be higher than, the values given with reference to the previous standards. According to the new Machinery Directive vibration values must be declared when they are higher than 2.5 m/s². For machines with emission values lower than 2.5 m/s² it is sufficient enough to state < 2.5 m/s², but lower values can be given voluntarily.

As we think it is important to give as much information as possible we, Diamantprodukter AB, have decided to quote also vibration values below 2.5 m/s². In this way we are able to show how the values vary depending on stroke length, rpm, tool weight etc.

Emission values below 2.5 m/s² imply a low risk of vibration injury resulting from normal use of the tool. It is important to realize that there can be other ergonomic factors that are more important to consider. It has been found that under real working conditions, the influences of the operator and the process can be particularly important at low magnitudes. For these reasons, it is stated in the new ISO 28927-series vibration measurement standards that it is not recommended that emission values below 2.5 m/s² be used for estimating the vibration magnitude under real working conditions. In such cases it is recommended that a vibration magnitude of 2.5 m/s² is used to estimate the machine vibration.

In the Operation Guide / Product Information vibration and noise emission values should always be given according to: ISO 28927 or EN 60745 published 2006 or later. The calculated uncertainty (K) should always be stated as well.

CHARACTERIZATION OF VIBRATIONS

Direction and location of measurements

The vibration transmitted to the hand shall be measured and reported for three different directions (3-axis values: x-y-z).

Measurements shall be made at the gripping zones, where the operator normally holds the machine and applies the feed force. For machines intended for one-handed operation, it is only necessary to measure at a single point. All our measurements, the equipment used and the calibration of the instruments have also been carried out according to ISO 20643:2005. The frequency weighing filter is in accordance with ISO 5349.

The measurement equipment from Brüel & Kjær that we have used fulfills:

ISO 5349.1:2001, Mechanical vibration. Measurement and evaluation of human exposure to hand-transmitted vibration. Part 1: General requirements and ISO 8041:2005. Human response to vibration. Measuring instrumentation.

ISO5349. 2:2001: Mechanical Vibration. Measurement and Evaluation of Human Exposure to Hand-transmitted Vibration.

Part 2: Practical Guidance for Measurement at the Workplace.

For field calibration a vibration calibrator type 4294 which is accredited and calibrated has been used. The vibration analyzer type 4447 and transducer 4524 (or4520) are calibrated and traceable.

For more information about measurement equipment for hand/arm and human vibrations see www.bksv.com

All the declared vibration values have been measured in accordance with ISO 28927-8: 2009(E).

“The text hereunder is taken from ISO 28927-8:2009 Hand-held portable power tools. Test methods for evaluation of vibration emission - Part 8: Saws, polishing and filing machines with reciprocating action and small saws with oscillating or rotating action, is reproduced with permission of the International Organization, ISO. This standard can be obtained from any ISO member and from Web site of ISO Central Secretariat at the following address: www.iso.org Copyright remains with ISO”

For Reciprocating filing and polishing machines (and straight transverse filing and polishing machines), following testing and operating conditions of machinery have to be followed:

1. File the horizontal surface of a work piece of mild steel at least 10mm thick and minimum:
L= 100mm and W= 100mm.
2. Stroke shall be set to 2mm and the speed to 6 000 rev/min.
3. The feed force used shall be 10 ± 2 N.
4. A new file blade as specified for filing mild steel and of mass 25 g shall be used.
5. The duration of measurement time shall be at least 8 seconds.

Added test methods for machines, tools, etc, that cannot be used with technical data as it says in point 1 to 5:

“For machines where this combination of stroke, speed and feed force cannot be obtained, the machine should be tested using the highest feed force normally used and the maximum stroke and speed recommended for that feed force. The used feed force, stroke and speed should be reported.”

We, Diamantprodukter AB, have decided to declare more vibrations values than necessary. This means that for all the different Diprofil Machines we can recommend tool using data in terms of speed, stroke length, tool weight and feed force etc.

Diprofil Polishing/Filing machines are only intended for fine precision: polishing, grinding and filing applications.

The Physical Agents (Vibration) Directive (valid in EU): A summary

The vibration directive was published on July 6, 2002. This directive must be active as national law not later than July 6, 2005

In the directive there are both an action value and a limit value defined. These values refer to the “daily exposure”. Daily exposure means the quantity of mechanical vibration to which an operator is exposed during a working day. The daily exposure is denoted A (8). It takes into account both the magnitude and duration of the vibration.

NOTE! The action value is 2.5 m/s² averaged over an 8-hour working day. For employees exposed to vibrations higher than the action value an action plan must be initiated to reduce the vibration exposure. A health surveillance program also has to be incorporated in the action plan. The action value is active from the day the national laws took effect.

The limit value is 5 m/s² averaged over an 8-hour working day. It will not be allowed to expose an operator to vibrations exceeding the limit value.

In the directive a transition period of maximum 5 years is introduced for the limit value. Member states are allowed to use this transition period in their national law. However, it is not permissible to exceed the limit of 5 m/s² as soon as it is possible by technical or organizational measures to reduce the exposure to below 5 m/s². The transitional period can only be used for equipment given to operators before 6 July 2007, i.e. for work involving new equipment the limit value is active from July 6, 2007 without any exceptions.

VIBRATIONS CALCULATOR

There is a Vibrations exposure calculator available at the Diprofil website. It is used for calculating the vibration exposure and you will be able to calculate the time before an operator average up to 2.5 m/s² or 5 m/s² over an 8-hour working day.

PRESENT STANDARDS AND DIRECTIVES RELATED TO HAND-ARM VIBRATION.

There are three parties involved. The Manufacturer, the Employer and the Operator.

THE RESPONSIBILITY OF THE MANUFACTURER

The responsibility of the manufacturer is regulated according to Machinery Directive (2006/42/EC). This directive deals with essential health and safety requirements of machinery.

The Machinery Directive requires the manufacturer to declare the vibration emission from his machines. The values shall be declared in accordance with the appropriate test code. Air-driven machines are declared according to the EN ISO 28927-series of standards. We Diamant-produkter AB have declared the vibration emission according to EN ISO 28927-series.

The vibration tests for electric hand-held machines are specified in parts of EN 60745 standards, or in those parts of EN 50144 standards that are still valid. Declarations according to parts of EN 60745 published prior to 2006, or to EN 50144 are all based on single-axis values EN 60745-1:2006 (and subsequent editions of EN 60745-2-x which refer to it) produce vibration total values.

Declared vibration values are based on measurements made under laboratory conditions. The power tool is often run under artificial conditions. The aim is repeatable and reproducible results.

THE RESPONSIBILITY OF THE EMPLOYER

The employer is responsible for the safety of his employees.

The employer must follow the national law regarding health and safety for his operators. All employers are responsible for the safety and health of his operators and must themselves be aware of the laws. With the new directive the law is basically the same in all countries in the European Union. The employer must keep the vibration exposure to a minimum level and perform vibration exposure assessments according to the Physical Agents (Vibration) Directive 2002/44/EC. (We recommend all parties involved to obtain this directive).

Once the action value 2.5 m/s^2 is exceeded the employer shall establish and implement a programme of technical and/or organizational measures intended to reduce to a minimum exposure to mechanical vibration and attendant risks, taking into account in particular:

- a) **The choice of appropriate work equipment with ergonomic design producing the least possible vibration (like Diprofil low vibration Di-Pro machines and most of the Diprofil Mini Polishing/Filing machines).**
- b) **Other working methods that require less exposure to mechanical vibration**
- c) **We recommend a program of health surveillance to detect early symptoms which may relate to vibration exposure, so the management procedures can be modified to help prevent future impairment.**
- d) **There are also a lot of other improvements that can be made to reduce the vibrations and thereof the risk of injury.**

THE RESPONSIBILITY OF THE OPERATOR

The operator is responsible for using the power tools according to given instructions and to react when he or she has reason to believe that vibrations are unusually high.

The operator is also the person exposed to vibrations and therefore the one to be protected from unnecessary vibration exposure.

FURTHER INFORMATION ABOUT VIBRATIONS/WORKING ENVIRONMENT, STANDARDS ETC.

- 1) For further information about all ISO (Standards Institute) member states in the world: http://www.iso.org/iso/iso_members
Just click on: Acronym to get information about e-mail addresses and/or the web-site to the different organisations.
- 2) Swedish Working Environment Organisations, link to the co-operative network in Europe and Scandinavia in English and Swedish: http://www.av.se/lankar_samarbetpartners/
- 3) An EU guide to managing hand-arm vibration can be found at: <http://www.humanvibration.com/EU/VIBGUIDE:htm>
<http://www.humanvibration.com>
- 4) The enforcing authority in the UK is the Health and Safety Executive (HSE) British Standards Institution. The HSE has very good information on the risks of vibration exposure and how to control those risks. You can find this information at: <http://www.hse.gov.uk/vibration/hav/>

- 5) French information:
For more information regarding Hand Arm Vibration, you may visit the following address.
<http://www.humanvibration.com/EU/VIBGUIDE/HAV%20guide%20French%20translation%20080606.pdf>
- 6) Deutschland:
Berufsgenossenschaft: www.vbg.de and www.bg-vibrationen.de
Technischer Überwachungsverein: www.tuv.com
Deutsches Institut für Normung: www.din.de
- 7) Denmark: "Danish Working Environment Authority", and Arbejdstilsynets guides about vibrations.
http://www.at.dk/REGLER/At-vejledninger-mv/Arbejdets-udforelse/At-vejledninger-om-arbejdets-udforelse/D6-Stoj-vibrationer-mv/D62-Hand-arm-vibrationer.aspx?sc_lang=da
http://www.bar-ba.dk/Faggrupper/Materiale%20alle%20faggrupper/stoej_vibrationer.aspx
- 8) American standard: BSR/CAGI B186.1- 200x
Safety Code for Portable Air Tools (DRAFT STANDARD)
Applies to the safety related aspects of the design, construction, installation, operation and maintenance of portable, hand-held, industrial air tools of the types used generally throughout industry for fabricating, assembly disassembly and material working.
Website: www.ansi.org
This organization may give information on what is valid in the USA.
- 9) Vibrations calculator
It is used for calculating the vibration exposure and you will be able to calculate the time before an operator average up to 2.5 m/s² or 5 m/s² using different hand tools over an 8-hour working day. Available in English or Swedish at:
<http://www.vibration.db.umu.se/Kalkylator.aspx?calc=HAV&lang=EN>
- 10) New standard is EN ISO 28927-8.
To buy your copy of EN ISO 28927-8 please, contact your national standardization organization at: http://www.iso.org/iso/about/iso_members.htm
- 11) The released Machine Directive 2006/42/EC, of the European Parliament and of the Council is active from December 29, 2009. For more information please see:
<http://ec.europa.eu.enterprise/sectors/mechanical/machinery/>
- 12) The Machine Directive 2006/42/EC. The Directive can be found in many different languages. Please choose your preferred language at the top right hand corner and thereafter click under headline: search result on pdf at:
http://eur-lex.europa.eu/Result.do?aaaa=2006&mm&jj=&type=l&nnn=157&pppp=RECH_reference_pub&Submit=S%C3B6k

For the latest available information please visit: www.diprofil.se



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