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MAGNETIC DRILLING MACHINES	BEVELING MACHINES	SAWING MACHINES
 <p>Manual FE 30 FE 32 FE 32 R/L FE 36 S FE 50 FE 50 R/L FE 100 R/L</p>	 <p>Manual FEB 20 FEB 30 FEB 45 FEB R25</p>	 <p>Manual FE 355</p>

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1. Safety procedures

When using magnetic drilling machines please follow the general safety instructions for electric power tools.

		
Please read the manual	Use eye protection	use ear protection
		
use safety helmet	use safety gloves	wear appropriate clothing
		
disconnect before opening	use safety chain	Warning for electrical shock
		
dangerous environment	don't use in wet places	pacemaker warning

TIP: Do not use your magnetic drill on the same structure when ARC welding is in progress. D.C. current will earth back through the magnet and cause irreparable damage.

WARNING: This appliance must be earthed.

1. Always secure the machine with the supplied safety chain before starting to operate, this to protect the user in case of power failure or breaking loose of the magnet whilst in use.
2. Always wear safety goggles, gloves and ear plugs.
3. Disconnect from the power source when changing cutters or working on the machine.
4. Always ensure cutter retaining screws are secure – they sometimes vibrate loose in use.
5. Regularly clean the work area and machine., remove swarf and dirt, paying particular attention to the underside of the magnet.
6. With a gloved hand, after switching off the power, remove any swarf which might have gathered around the cutter and arbor before proceeding to the next hole.
7. Remove tie, rings, watches and any loose adornments which might entangle with the rotating parts of the machine.
8. Should the cutter get stuck in the workpiece, stop the motor immediately to prevent personal injury. Disconnect from the power source and push and pull the arbor by hand. **DO NOT ATTEMPT TO FREE THE CUTTER BY SWITCHING THE MOTOR ON AND OFF.**
9. If the machine is accidentally dropped, always thoroughly examine the machine for signs of damage and check that it functions correctly before trying to drill a hole.
10. Regularly inspect the machine and check the nuts and screws are tight.
11. Always ensure when using the machine in an inverted position that only the minimum amount of coolant is used and that care is taken to ensure the coolant does not drip in the motor unit. We advise you to use special cutting **paste** which is specially designed for inverted position drilling.
12. **ONLY** use spare parts advised by your dealer for magnetic drilling machines.
13. Use the magnetic drilling unit on a clean and flat surface only, to prevent the machine breaking out because of poor clamping force.
14. If you discover any irregularity on machine cables immediately bring the machine to a recognized dealer for a repair or maintenance service.

2. Technical overview

	FE 30	FE 32	FE 32 R/L	FE 36 S	FE 50	FE 50 R/L	FE 100 R/L
Motor	800 W	900 W	1050 W	1080 W	1150 W	1150 W	1800 W
Spindle	Direct – 19 mm Weldon	½"x20 NF – 19 mm Weldon	½"x20 NF – 19 mm Weldon	Direct – 19 mm Weldon	MT 2 – 19 mm Weldon	MT 2 – 19 mm Weldon	MT 3 – 19 mm Weldon
Hole cutter 30 mm	30 mm	32 mm	32 mm	36 mm	50 mm	50 mm	100 mm
Hole cutter 55 mm	30 mm	32 mm	32 mm	N/A	50 mm	50 mm	100 mm
Hole cutter 110 mm	N/A	N/A	N/A	N/A	50 mm	50 mm	100 mm
Countersink	N/A	N/A	30 mm	N/A	N/A	40 mm	55 mm
Reaming	N/A	N/A	N/A	N/A	N/A	23 mm	31.75 mm
Twist drills	N/A	13 mm	13 mm	N/A	23 mm	23 mm	31.75 mm
Tap	N/A	N/A	M 16	N/A	N/A	M 20	M 30
RPM	450 min ⁻¹	450 min ⁻¹	0-350 min ⁻¹	400 min ⁻¹	I 250 min ⁻¹ II 450 min ⁻¹	I 50-250 min ⁻¹ II 100-450 min ⁻¹	I 40-140 min ⁻¹ II 120-480 min ⁻¹
Stroke	80 mm	150 mm	150 mm	39 mm	150 mm	150 mm	250 mm
Weight	9.9 kg	12 kg	12 kg	11 kg	13 kg	13 kg	27 kg
Magnet	1500 kg	1500 kg	1500 kg	1200 kg	1700 kg	1700 kg	3500 kg






Check power supply

Make sure the used current corresponds with the machine specifications. When using a cable extension make sure it can do the job.

3. Operating instructions

4.1 Hole cutter selection

Before starting to drill make sure the cutter of your choice is the right one for the job you want to do. Following cutters are available in the Fe Powertools program:

Hole cutter	Aluminium	Steel < 500 N/m ²	Steel < 700 N/m ²	Steel < 1000 N/m ²	Stainless Inox	Cast iron	Rail track
							
HSS	25-30 m/min	25 m/min				10-20 m/min	
Cutting oil		•					
Coolant spray		•					
Cutting paste							
Special oil	•						
							
HSS coated			10-15m/min	10-15m/min	10-15m/min		
Cutting oil			•	•	•		
Coolant spray			•	•	•		
Cutting paste				•	•		
Special oil				•	•		
							
TCT		35 m/min	25 m/min	20 m/min VCE	20 m/min VCE		
Coolant		•	•	•	•		
Cutting emulsion		•	•	•	•		
							
TCT coated		35 m/min	25 m/min	20 m/min	20 m/min		
Coolant		•	•	•	•		
Cutting emulsion		•	•	•	•		
							
TCT Rail							15-20 m/min
Coolant							
Cutting emulsion							

VCE = full automatic drilling

Feed rates:

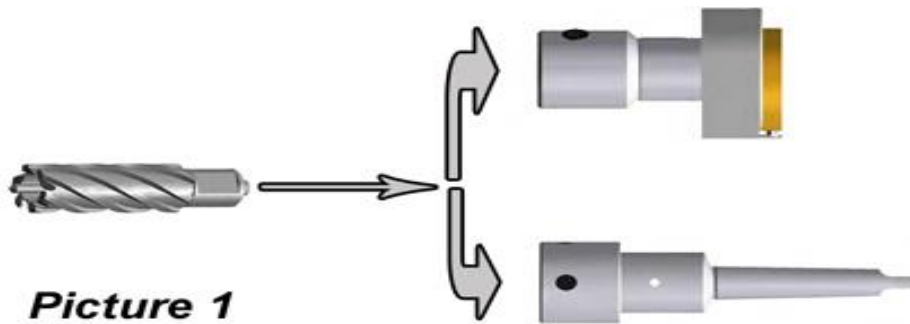
$$V_c = \frac{d \times P \times n}{1000} = \text{m/min}$$

Cutting speed:

$$n = \frac{v \times 1000}{d \times P} = \text{min}^{-1}$$

4.2 How to mount tools or adapters in a Weldon arbor?

- 1) Make sure the machine is disconnected from the power supply.
- 2) Put the center pilot in the cutter hole.
- 3) Put the cutter or adapter in the arbor, making sure the flat sides are exactly in front of the arbor retaining screws (picture 1).
- 4) Tighten the retaining screws.
- 5) Check if the center pilot can move inside the cutter (up and down).



4.3 Drilling with hole cutters

- 1 Place the machine at the desired position

TIP: For 100% magnet clamping force you need at least 10 mm of steel. Coatings, paintings and dirt between magnet and workpiece will affect clamping force.

- 2 Switch on the magnet



- 3 Ensure that the magnetic drilling unit is secure on the working piece.
- 4 Fill the arbor with lubrication/cutting oil in the special meant holes. Always use cutting oil from your dealer.
- 5 Set the right RPM by adjusting the gear switch and/or variable speed control. (models FE 32 R/L, FE 50 R/L and FE 100 R/L). The gear switch can be found on the side of the gear box. Variable speed for FE R/L is placed on the control panel. The variable speed adjust of FE 50 R/L and 100 R/L can be found on the side of the drilling unit.
- 6 Start the motor by pressing the green motor start button (I).



- 7 Start bringing the cutter to the workpiece but handle with care and do not apply too much pressure. The cutter has to find its way in to the material by itself. After 2 mm, the groove of the cut will help the cutter maintain its place and you can increase the power.

Still it is not necessary to use a lot of pressure. Too much pressure will cause damage and breakage.

- 8 After the cut is finished the slug will automatically be ejected from the cutter, switch the machine off by pushing the red button(0).
- 9 If the slug gets stuck in the cutter, move the machine to a flat surface. Switch on the magnet and gently bring the cutter down in contact with the surface. This usually allows a slug to straighten and to eject.

WARNING: The slug will be ejected and is very hot

4.4 Drilling with twist drills

There are several accessories available to be able to use twist drills with your magnetic drill.

- Adapter 19 mm Weldon - ½"x20 UNF
- Adapter 19 mm Weldon – B16 taper connection
- Adapter 19 mm Weldon – B18 taper connection

These adapters will allow you to attach a drill chuck on to the hole cutter arbor.

However when using longer twist drills you will notice the stroke of your magnetic drilling machine is often not large enough. With models FE 32 and FE 32 R/L you are able to remove the hole cutter arbor and guidance. It will reveal a ½"x20 NF direct connection on the drilling unit, enabling you to attach a corresponding drill chuck. To dismount the arbor unscrew the 4 hexagon screws under the guidance support. After, unscrew the arbor from the motor using an open ended spanner 18 and 20 mm.

Models FE 50, FE 50 R/L and FE 100 R/L are equipped with Morse taper adapters. They can be removed easily and a twist drill or drill chuck with direct taper connection can be inserted in to the drilling unit.

Also twist drills with a direct Weldon connection are available (ranging from Ø 6 – Ø 12 mm)

- 1 Place the machine at the desired position
- 2 Switch on the magnet



- 3 Ensure that the magnetic drilling unit is secure on the working piece.
- 4 Apply cutting oil to the twist drill and workpiece. Always use cutting oil from your dealer.
- 5 Set the right RPM by adjusting the gear switch and/or variable speed control. (models FE 32 R/L, FE 50 R/L and FE 100 R/L). The gear switch can be found on the side of the gear box. Variable speed for FE 32 R/L is placed on the control panel. The variable speed adjust of FE 50 R/L and FE 100 R/L can be found on the side of the drilling unit.
- 6 Start the motor by pressing the green motor start button.



- 7 Start bringing the twist drill to the workpiece but handle with care and do not apply too much pressure. The drill has to find its way in to the material by itself. It is not necessary to use a lot of pressure. Too much pressure will cause damage and breakage.
- 8 After the cutting is finished switch the machine off by pushing the red button.

3.5 Tapping / threading

With models FE 32 R/L, FE 50 R/L and FE 100 R/L you are able to make a thread in the drilled hole. All 3 models have a reverse option. Only model FE 100 R/L has the possibility to make thread in “blind” holes. FE 50 R/L and FE 100 R/L drilling units are equipped with a direct Morse taper connection. A tap chuck can be inserted to this connection.

Model FE 32 R/L can only make threads using the tap holder inserts (picture 2). Tap holders DIN376 M10, M12 and M14 are standard delivered with every FE 32 R/L and FE 50 R/L.



Picture 2

Available sizes:

- DIN376: M8, M10, M12, M14, M16, M18, M20, M22-24, M27, M30
- ISO529: M8, M10, M12, M14, M16, M18, M20, M22-24, M27, M30

- 1 Place the machine at the desired position
- 2 Switch on the magnet



- 3 Ensure that the magnetic drilling unit is secure on the working piece.
- 4 Apply cutting oil to the tap and workpiece. Always use cutting oil from your dealer.
- 5 Set the right RPM by adjusting the gear switch and/or variable speed control. (models FE 32 R/L, FE 50 R/L and FE 100 R/L). The gear switch can be found on the side of the gear box. Variable speed for FE 32 R/L is placed on the control panel. The variable speed adjust of FE 50 R/L and FE 100 R/L can be found on the side of the drilling unit. First set the correct gear, after adjust the variable speed.

TIP: If possible, always select a setting with low transmission ratio and high motor speed.

- 6 Start the motor by pressing the green motor start button.



- 7 Start bringing the tap to the workpiece but handle with care and do not apply pressure. When the tap touches the material it is automatically pulled into the material. After you will have to use minimum pressure to feed the tap. Too much pressure will cause damage and breakage.
- 8 After the tapping is finished switch the machine to reverse and the tap will be retracted.

TIP: In order to protect the first thread cut, rotate the motor slide upwards after you have retracted the tap out of the material.

3.6 Speed and torque setting

Fe Powertools magnetic drills are provided with following speeds

FE 30	450 min ⁻¹
FE 32	450 min ⁻¹
FE 32 R/L	0-350 min ⁻¹
FE 36 S	400 min ⁻¹
FE 50	250 min ⁻¹ 450 min ⁻¹
FE 50 R/L	50-250 min ⁻¹ 100-450 min ⁻¹
FE 100 R/L	40-140 min ⁻¹ 120-480 min ⁻¹

To adjust speed first set the required gear using the gear switch on the side of the gearbox. After the speed can be fine-tuned using the rotary switch on the side of the drilling unit (FE 50 R/L, FE 100 R/L) or on the control panel (FE 32 R/L).

With model FE 100 R/L the torque setting can be electronically controlled by means of the rotary switch. If the setting is reduced, the machine will switch off in case of increased load. It is recommended to test this during the first applications so that cutter breakage is avoided if the user is unskilled.

TIP: After the machine stops, caused by the torque control, you have to press the 0 on the motor on/off switch before you can turn on the machine again.

In case of blocking, model FE 100 R/L is extra protected by a safety clutch.

4. Tips and Tricks

TIP: Do not use your magnetic drill on the same structure when ARC welding is in progress. D.C. current will earth back through the magnet and cause irreparable damage.

TIP: When using models with gear and variable speed always select a setting with low transmission ratio and high motor speed, if possible.

TIP: After tapping, in order to protect the first thread cut, rotate the motor slide upwards after you have retracted the tap out of the material.

TIP: After the FE 100 R/L stops, caused by the torque control, you have to press the 0 on the motor on/off switch before you can turn on the machine again.

TIP: After FE 100 R/L stops, caused by the thermal protection, let the motor run on high speed and no load for about 2 minutes in order to cool down.

TIP: For 100% magnet clamping force you need at least 10 mm of steel. Coatings, paintings and dirt between magnet and workpiece will affect clamping force.

TIP: Most situations which cause problems or question marks have already occurred for other users. Contact Fe Powertools or your dealer to see if a solution exists for your situation. (example: for drilling into non-magnetic material with your magnetic drill, a special vacuum system has been designed).

TIP: The levers of FE 36S can be changed to both sides

WARNING: This appliance must be earthed.

WARNING: After drilling the slug will be ejected and is very hot.

WARNING: When drilling in inverted position, cutting oil can enter the motor and can cause irreparable damage.

WARNING: When drilling in inverted position, metal swarf can enter the motor. This can cause irreparable damage and can cause electrical shocks.

WARNING: Steel plates of less than 10 mm thickness, coatings, paints and dirt between magnet and workpiece can affect clamping force and create a possible dangerous situation. Always make sure your magnetic drill is fastened with the supplied safety chain and make sure your machine is sufficient attached to the workpiece to start drilling.

5. Maintenance

Guidance: Check guidance regularly, it may have to be adjusted. Release the counter nuts when dealing with machines with guide beads and tighten the setscrews uniformly. Then retighten the counternuts.

Tool holder/arbor: Clean the tool holder/arbor from the interior regularly.

Switches and cables: Check switches, cables and buckling protection for damages at regular intervals.

Carbon brushes: Check carbon brushes and replace them in time. Used carbon brushes leave fine dust that deposits in the upper part of the motor. Therefore clean the upper part of the motor regularly. This way, swarf that might have come into the motor through ventilation gaps are also removed. Damages on armature, winding and the motor board are reduced.

6. CE Declaration of Conformity

Company: Fe Powertools BV
Curieweg 30
2408 BZ Alphen aan den Rijn
The Netherlands

We hereby declare that the product conforms to the following relevant regulations:

- EC Directive 2006/42/EC on Machinery
- EU Directive 2004/108/EU on Electromagnetic Compatibility

The following harmonized standards were applied in whole or in part:

- DIN EN ISO 12100:2010
- DIN EN 61000-6-4:2007+A1:2011
- DIN EN 55014-1:2006+A1:2009+A2:2011
- DIN EN 55014-2:1997+Corr 1997+A1:2001+A2:2008
- DIN EN 60745-1:2009
- DIN EN 60745-2-1:2010

Responsible person for documentation according to EC Directive 2006/42/EC-Annex 11 Pt.A.2. was Mr. J.M. Korsten, Managing Director Fe Powertools BV

Alphen aan den Rijn, 1st January 2014



Mark Korsten

7. Warranty

The warranty period for Fe Powertools equipment is 12 months as of the date of purchase.

Damages due to wear and tear, overload or improper handling of the machine are excluded from warranty. Damages that are due to fault in material or defect in fabrication will be remedied free of cost by compensation delivery or repair.

Complaints can only be accepted if the device is send undismantled and free of charge to Fe Powertools or to a competent service partner.

Claims for damages cannot be derived from this warranty .

Please fill out the warranty or add the purchase receipt.

MACHINE TYPE :

MACHINE NUMBER :

DATE OF PURCHASE :

STAMP/SIGNATURE SPECIALISED DEALERS :

ERROR DESCRIPTION: