

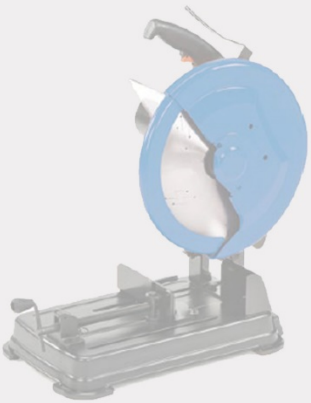


# FEpowerTools®

[WWW.FEPOWERTOOLS.COM](http://WWW.FEPOWERTOOLS.COM)

MAGNETIC DRILLING MACHINES	BEVELING MACHINES	SAWING MACHINES
 <p>Manual FE 30 FE 32 X FE 36 S FE 50 X FE 50 RLX FE 60 RLX 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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## 2. Instructions Before Use - Safety Warning Explanation

### Safety Warning Explanation

Following warnings are present in this manual

<b>⚠ DANGER</b>
<b>A warning of this category draws attention to an impending dangerous situation.</b> If the dangerous situation is not avoided, it may lead to serious injury or even death. <ul style="list-style-type: none"><li>➤ Follow the instructions in this warning to avoid the danger of serious injury or even death.</li></ul>
<b>⚠ WARNING</b>
<b>A warning of this category draws attention to a potentially dangerous situation.</b> If the dangerous situation is not avoided, it may lead to injuries. <ul style="list-style-type: none"><li>➤ Follow the instructions in this warning to avoid the risk of injury.</li></ul>
<b>CAUTION</b>
<b>A warning of this category draws attention to potential material damage.</b> If the situation is not avoided, it may lead to material damage. <ul style="list-style-type: none"><li>➤ Follow the instructions in this warning to avoid material damage.</li></ul>
<b>NOTE</b>
<ul style="list-style-type: none"><li>➤ A note draws attention to additional information that simplifies the use of the machine.</li></ul>

### Instructions Before Use

The machine is intended solely for drilling operations in magnetic and non-magnetic metals, and for cutting threads, countersinking and reaming within the limits specified in the technical data.

Use in any other or further way is not considered an intended use.

<b>⚠ WARNING</b>
<b>Danger from use for other than the intended purpose!</b> If not used for its intended purpose and/or used in any other way, the machine may be or become a source of danger. <ul style="list-style-type: none"><li>➤ Use the machine only for its intended purpose.</li><li>➤ Observe the procedures described in these operating instructions.</li></ul>

No claims of any kind will be accepted for damage or injury resulting from use of the machine for other than its intended purpose.

The risk has to be borne solely by the machine owner.

## **NOTE**

- If used commercially, pay attention to compliance with the accident prevention regulations and the Safety at Work Ordinance.

### ***Liability Disclaimer***

All technical information, data and instructions for commissioning, operation and care of the machine contained in these operating instructions represent the latest status at the time of printing. The manufacturer assumes no liability for damage or injury resulting from failure to observe the operating instructions, use for other than the intended purpose, unprofessional repairs, unauthorised modifications or use of non-approved spare parts and accessories, tools and lubricants.

## **⚠ CAUTION**

**When using electrical tools, the following fundamental precautions must be taken to protect against electric shock and the risk of injury and fire!**

### 3. Technical overview / Before Use: Fundamental Safety Precautions

	FE 30	FE 32X	FE 36 S	FE 50 X	FE 50 RLX	FE 60 RLX	FE 100 R/L	
Motor	1050 W	1050 W	1080 W	1150 W	1150 W	1600 W	1800 W	
Spindle	Direct – 19 mm Weldon	Direct – 19 mm Weldon	Direct – 19 mm Weldon	MT 2 – 19 mm Weldon	MT 2 – 19 mm Weldon	MT 3 – 19 mm Weldon	MT 3 – 19 mm Weldon	
Hole cutter mm	30	30 mm	32 mm	36 mm	50 mm	50 mm	60 mm	100 mm
Hole cutter mm	55	30 mm	32 mm	N/A	50 mm	50 mm	60 mm	100 mm
Hole cutter mm	110	N/A	N/A	N/A	50 mm	50 mm	60 mm	100 mm
Countersink	N/A	N/A	N/A	N/A	40 mm	50 mm	55 mm	
Reaming	N/A	N/A	N/A	N/A	23 mm	25 mm	31.75 mm	
Twist drills	N/A	13 mm	N/A	23 mm	23 mm	25 mm	31.75 mm	
Tap	N/A	N/A	N/A	N/A	M 5-20	M 5-20	M 6-30	
RPM	$n_0$ 750 min <sup>-1</sup> n 460 min <sup>-1</sup>	$n_0$ 750 min <sup>-1</sup> n 460 min <sup>-1</sup>	$n_0$ 700 min <sup>-1</sup> n 400 min <sup>-1</sup>	$n_0$ 400 min <sup>-1</sup> $n_0$ 730 min <sup>-1</sup> n 250 min <sup>-1</sup> n 450 min <sup>-1</sup>	$n_0$ 50-250 min <sup>-1</sup> $n_0$ 100-450 min <sup>-1</sup>	$n_0$ 70-280 min <sup>-1</sup> $n_0$ 180-580 min <sup>-1</sup>	$n_0$ 40-140 min <sup>-1</sup> $n_0$ 120-480 min <sup>-1</sup>	
Stroke	70 mm	160 mm	39 mm	160 mm	160 mm	160 mm	250 mm	
Weight	9.9 kg	12 kg	11 kg	12 kg	12 kg	15 kg	27 kg	
Magnet	845 kg min. 1500 kg max.	845 kg min. 1500 kg max.	715 kg min. 1500 kg max.	915 kg min. 1200 kg max.	915 kg min. 1700 kg max.	910 kg min. 1700 kg max.	1430 kg min. 3500 kg max.	
Noise Level	90db(A)	87db(A)	89db(A)	87db(A)	87db(A)	89db(A)	89db(A)	
Vibration	1,64 m/s <sup>2</sup>	0,81 m/s <sup>2</sup>	0,85 m/s <sup>2</sup>	0,81 m/s <sup>2</sup>	0,81 m/s <sup>2</sup>	0,85 m/s <sup>2</sup>	0,85 m/s <sup>2</sup>	

### **Fundamental Safety Precautions**

- Do not use the machine in flammable or potentially explosive environments.
- Persons who due to their physical, mental or motor response abilities are unable to operate the machine safely may only use the machine under supervision or instruction by a responsible person.
- Persons with heart pacemakers or other medical implants must not use this machine.
- Children must not be allowed to use the machine.
- Inspect the machine for visible signs of damage before use. Do not use a visibly damaged machine.
- Before beginning work, check the condition of the safety chain and the function of the switches on the machine.
- Repairs to the mains cable may only be carried out by a qualified electrician.
- Repairs to the machine may only be carried out by an authorised workshop or by the works after-sales service. Unqualified repairs can lead to considerable danger for the user.
- Repairs to the machine during the warranty period may only be carried out by a service centre authorised by the manufacturer, as otherwise the warranty will be voided.
- Defective parts may only be replaced with original spare parts. Only these parts guarantee that the safety requirements are satisfied.
- Do not leave the machine unsupervised during operation.
- Store the machine in a dry, temperate location out of the reach of children.
- Do not leave the machine standing outdoors and do not expose it to moisture.
- Make sure that your work area is sufficiently lit (>300 Lux).
- Do not use low power machines for heavy working.
- Make sure that your workplace is clean.
- Keep the machine clean, dry and free of oil and grease.
- Follow the instructions on lubricating and cooling the tool

### **Electric Shock Hazard**

#### **DANGER**

#### **Danger to life by electric shock!**

#### **Contact with live wires or components could lead to serious injury or even death!**

Observe the following safety precautions to avoid electric shocks:

- Do not open the housing of the machine. Risk of electric shock if live terminals are touched.
- Never immerse the machine or the plug into water or other liquids.
- Use only extension leads or cable drums with a cable crosssection of 1.5 mm<sup>2</sup>.
- Only use extension leads that are approved for the place of work.
- Check the condition of the extension lead regularly and replace if damaged.
- Avoid direct body contact with grounded parts (e.g., tubes, radiators, steel girders) to reduce the risk of electric shock in the event of a defect.

## WARNING

### **Improper handling of the machine increases the risk of injury!**

- Observe the following safety precautions to avoid injuring yourself and/or others:
- Operate the machine only with the protective equipment stipulated in these operating instructions (see section **Personal protective equipment**).
- Do not wear protective gloves when the machine is running. A glove can be caught by the drilling machine and torn off the hand. Risk of losing one or more fingers.
- Remove loose jewellery before beginning work. Wear a hair net if you have long hair.
- Always switch off the machine before changing tools, performing maintenance or cleaning. Wait until the machine has come to a complete standstill.
- Always remove the plug from the mains socket before changing tools, cleaning or performing maintenance, in order to avoid unintentional starting of the machine.
- Do not put your hand into the machine while it is in operation. Remove shavings only when the machine is at a standstill. Wear protective gloves when removing swarf.
- When working on scaffolding, the operator must be secured with a safety belt as the machine can oscillate dangerously in the event of interruption to the power supply.
- Check for secure clamping of the electromagnets on the substrate before every use (see section **Preparing**).
- Secure the machine with the safety chain supplied when working from an inclined or vertical position or during overhead work. The machine could fall down if the magnet is loosened or the power fails.
- Check that the tool is tightened securely before using (see section **Inserting the tool**).
- Do not allow the connecting cable to hang over edges (danger of tripping).

## **Prevention of Damage**

### CAUTION

#### **Potential property damage in case of inexpert handling of the machine!**

Observe the following instructions to avoid property damage:

- Before connecting the machine, compare the connection data (voltage and frequency) on the rating plate with those of your mains power supply. The data must correspond in order to avoid damage to the machine.
- Always carry the machine at the handle, not by the connecting lead.
- Always pull the mains lead out of the plug socket at the plug, not at the mains lead.
- Do not pinch the connecting lead.
- Do not expose the connecting lead to heat or chemical liquids.
- Do not pull the connecting lead across sharp edges or hot surfaces.
- Lay the connecting lead in such a way that it cannot be caught and wound up in the rotating part of the machine.

## **Installed Safety Features**

### **Restart Protection**

#### **NOTE**

- The machine stops automatically if the magnetic clamp is switched off or in the event of a power failure.

In order to prevent unexpected starting of the machine when the magnetic clamp is switched on again or when the power supply returns after a power failure ("restarting protection"), the machine must be switched on at the ON/OFF switch again.

### **Thermal overload protection**

The machine is additionally equipped with thermal overload protection. If the machine becomes too hot, it switches off automatically.




Carry out the following steps before continuing to work with the machine:

- Remove any blockages that may have occurred.
- Allow the machine to run at no-load speed for approx. 2 minutes.

The machine is then ready for operation again.

### **Used Symbols**




Symbols present on the machine have the following meaning:

Symbol	Meaning
	Electric shock hazard!
	Read the operating instructions before beginning work!
	Wear protective goggles and ear protection!






## Personal Protective Equipment

Wear the following protective equipment at all times when working with the machine:






Symbol	Meaning
	Close-fitting work protection clothing with a low tearing resistance
	Goggles for protecting eyes against flying parts and liquids and ear protection in areas with noise emission >80 dB(A)
	Safety shoes to protect the feet from falling objects

Wear the following additional protective equipment during special operations

Symbol	Meaning
	Helmet to protect your head from falling objects
	Wear a safety belt where there is a danger of falling
	Working gloves as protection against injury

#### 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	Steel	Steel	Stainless	Cast iron	Rail track
Coolant							
		< 500 N/m <sup>2</sup>	< 700 N/m <sup>2</sup>	< 1000 N/m <sup>2</sup>	Inox		
							
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:  

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

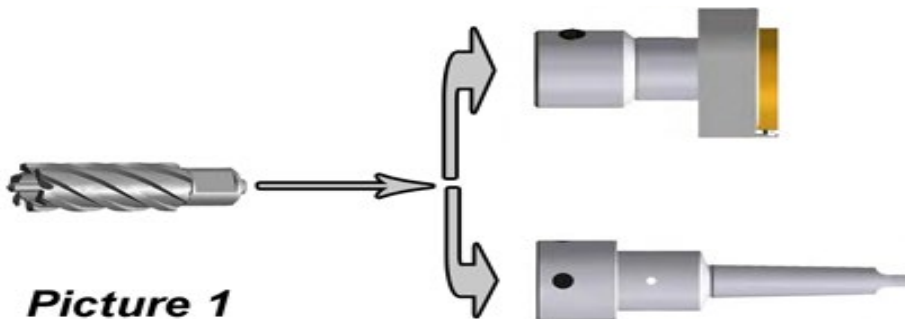
#### 4.2 How to mount tools or adapters in a Weldon arbor?

##### **⚠ WARNING**

##### **Risk of injury from incorrectly inserted tool or tool mounting .**

- Check by briefly turning the tool whether the collet is engaged.

- 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

##### **CAUTION**

- Switch on the magnetic clamp only when the machine is standing on a magnetic substrate to avoid overheating of the magnet.
- 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.. The gear switch can be found on the side of the gear box.

### CAUTION

- Switch over the gear stages only with the machine at standstill.

- 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(O).
- 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.

### CAUTION

- The slug will be ejected and is very hot
- The machine can only be switched on when the magnetic clamp has been switched on.
- Allow a severely overheated machine to run on at no-load speed for approx. 2 minutes to let it cool down.
- The machine switches off automatically in the event of a power failure or if the magnetic clamp is switched off.

#### 4.4 Drilling with twist drills

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

- Adapter Morse taper 2 – B16 taper connection
- Adapter Morse taper 2 – B18 taper connection

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

Model FE 50 X is equipped with a Weldon Morse taper adapter. It 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  $\varnothing$  6 –  $\varnothing$  12 mm)

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



#### CAUTION

- Switch on the magnetic clamp only when the machine is standing on a magnetic substrate to avoid overheating of the magnet.
- 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.

- 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. The gear switch can be found on the side of the gear box.
- 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.

## 1.5 Speeds and Settings

Fe Powertools magnetic drills are provided with following speeds (load)

FE 30	460 min <sup>-1</sup>
FE 32 X	460 min <sup>-1</sup>
FE 50 X	250 min <sup>-1</sup> 450 min <sup>-1</sup>
FE 50 X	50-250 min <sup>-1</sup> 100-450 min <sup>-1</sup>
FE 60 RLX	70-280 min <sup>-1</sup> 120-480 min <sup>-1</sup>
FE 100 R/L	40-140 min <sup>-1</sup> 120-480 min <sup>-1</sup>

To adjust speed, set the required gear using the gear switch on the side of the gearbox.

## 5. Blockage

### **WARNING**

#### **Risk of injury from incorrectly inserted tool or tool mounting .**

- Check by briefly turning the tool whether the collet is engaged.

#### **Blockages caused by a broken tool:**

- Switch off the machine. Remove plug from the mains socket.
- Use the handle to move the machine slide to the upper position.
- Replace defective tool. Remove shavings.

#### **Other blockages:**

- Switch the machine off at the motor switch. Leave magnetic clamp switched on.
- Use the handle to move the machine slide to the upper position.
- Remove shavings and check tool.

## Cleaning

### **WARNING**

- Switch off the machine and pull the mains plug out of the plug socket before starting maintenance and cleaning.
- When using compressed air for cleaning, wear protective goggles and protective gloves and protect other persons in the working area.

### **CAUTION**

- Never immerse the machine in water or other liquids.

#### **After Use:**

- Remove the installed tool.
- Remove chips and coolant residues.
- Clean the tool and the tool mounting on the machine.

- Clean the guide of the machine slide.
- Return the machine and accessories to the transport case.

## 6. Maintenance

### **WARNING**

#### **Danger caused by unqualified repairs!**

Unqualified repairs can pose considerable dangers for the user and cause damage to the machine.

- Repairs to electrical appliances may only be carried out by the works after-sales service or by specialists trained by the manufacturer.

#### **Adjusting the guide of the machine slide**

If the guide of the machine slide (14) shows signs of backlash, it must be adjusted. Proceed as follows:

- Loosen the clamping bolts.
- Tighten the adjusting screws uniformly.
- Tighten the clamping bolts again.

#### **Replacing the carbon brushes**

Replacement of the carbon brushes may only be carried out by Fe Powertools or by an authorised repair workshop. Unauthorised repairs will void the warranty.

#### **After-Sales Service/Service**

Should you have any questions about after-sales service or service, please contact Fe Powertools. We will be happy to give you the address of your nearest service partner.



## Troubleshooting

### Faults - causes and remedies

#### NOTE

- If you cannot resolve the problem with the steps described above, please contact After-Sales Service.

Fault	Possible cause	Remedy
The motor does not start after pressing the ON/ OFF switch or stops during operation.	Plug not inserted into socket.	Insert plug.
	Automatic circuit breaker tripped.	Switch on the automatic circuit breaker again.
	The magnetic clamp is not switched on.	Switch on the magnetic clamp.
	The internal safety switch has switched off the machine due to overheating.	Allow the machine to cool down.
	Direction of rotation not selected.	Preselect direction of rotation.
	The torque cut-out has tripped.	Switch the machine off and on again.
The automatic circuit breaker in the electrical distribution board trips	Too many appliances connected to the same power circuit.	Reduce the number of appliances on the power circuit.
	Machine is defective.	Contact After-sales Service.
The magnetic clamp does not function.	Magnet not switched on.	Switch on magnet.
	The surface is not magnetic.	Use a suitable base.
The lubrication system does not function.	No lubricant available.	Top up the lubricant.
	Lubricant tap closed.	Open the lubricant tap.
	Connecting nipple clogged.	Clean tank and nipple.

## Storage/disposal

If you do not intend to use the machine for a longer period of time, clean it as described in chapter **Cleaning**. Store the machine and all the accessories in the transport case in a dry, clean and frostfree location.

### Disposal of the packaging

The packaging protects the machine from transport damage. The packaging materials have been selected according to environmental and waste disposal aspects and can therefore be recycled.



The return of the packaging to the material cycle helps conserve raw materials and reduces the production of waste.

When no longer required, dispose of the packaging materials in accordance with the local regulations in force.

### Disposal of the old appliance

Within the European Community, this product must not be disposed of in the domestic refuse.



Dispose of the product in accordance with the EC Directive 2002/96/EC-WEEE (Waste Electrical and Electronic Equipment).

Should you have any questions, please contact your local authority responsible for waste disposal.

## Disposal of the lubricant

### **WARNING**

- Observe the disposal instructions from the lubricant manufacturer.

Name/address of manufacturer:	<b>Fe Powertools BV</b> <b>Curieweg 30</b> <b>2408 BZ Alphen aan den Rijn</b> <b>The Netherlands</b>
We hereby declare that the product	
Model:	<b>Magnetic core drilling machine</b>
Type:	<b>FE 30 – FE 32 X - FE 36 S - FE 50 X – FE 50 RLX – FE 100 R/L</b>
Conforms to the following relevant regulations:	
<p>■ <b>EC Directive 2006/42/EC on Machinery</b></p>	
<p>The following harmonised standards were applied in whole or in part:</p> <ul style="list-style-type: none"> <li>● DIN EN ISO 12100:2011-13</li> <li>● DIN EN 61029-1/A11:2011-11</li> <li>● DIN EN 62841-1:2012-11</li> </ul>	
Responsible person for documentation according to EC Directive 2006/42/EC - Annex II Pt.A.2. was:	
<p>_____</p> <p>(Surname, forename, position in company of the manufacturer)</p>	
Alphen aan den Rijn, 1-3-2016	<p>Mark Korsten, General Manager</p> <p>_____</p> <p>(Legally binding signature of the issuer)</p>