



WORLD
PRECISION
INSTRUMENTS

INSTRUCTION MANUAL

WPI P40

Microdrill

Serial No. _____

www.wpiinc.com

112023

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ABOUT THIS MANUAL

The following symbols are used in this guide:



This symbol indicates a CAUTION. Cautions warn against actions that can cause damage to equipment. Please read these carefully.



This symbol indicates a WARNING. Warnings alert you to actions that can cause personal injury or pose a physical threat. Please read these carefully.

NOTES and TIPS contain helpful information.



Fig. 1—WPI P40 Microdrill

INTRODUCTION

The line powered WPI P40 Drill makes easy work of grinding, finishing, cutting, and drilling bone, teeth and other material. The high-torque 40,000 RPM (maximum) motor is quiet and has minimal vibration, reducing wear on the motor and providing greater comfort for users. It also features a forward/reverse switch, "E Type" handpiece and handpiece holder. It accepts 3/32" (or 2.35mm) bur shanks. Unlike battery-powered drills, this unit maintains consistent power for the duration of use. The wide range of speeds allows you to control the amount of heat generation.

Notes and Warnings

Please read the following cautions carefully before operating your new WPI P40 Drill.

Work Area

NOTE: Do NOT work in a dangerous place. Keep the workplace clean. Debris may cause an accident.

NOTE: Do NOT use the control box in a humid place.



WARNING: WEAR PROPER PROTECTIVE CLOTHES AND EQUIPMENT, INCLUDING A DUST MASK AND SAFETY GOGGLES. USE A PROPER SUCTION UNIT AND A VENTILATOR.

Operation

NOTE: Use the handpiece and foot pedal with the control unit only.



CAUTION: Do NOT drop the handpiece. It may be damaged or broken. If it is dropped, verify that the bur is not bent and that no excessive heat is generated during normal drill operation.



CAUTION: Check for any troubles, including excessive vibration of bur, at low speed, and then start high speed.



CAUTION: Ensure that the handpiece comes to a complete stop before setting it down or changing motor direction.

Bur and Chuck

NOTE: Turn off the power and disconnect the handpiece when changing the bur.

NOTE: When the chuck is locked, the maximum projection length of the bur should be less than 35 mm.

NOTE: Use a bur that conforms to ISO standards.

NOTE: Keep a bur in the handpiece collet chuck after operation.



CAUTION: Do not open the chuck while operating.



CAUTION: Avoid using a rusty or bent bur that may cause excessive wear of bearings. See to the safety recommendations (operating speed and precautions) for the bur. See Fig. 2 on page 3.

Allowable RPM/Bur Diameter

Bur material and application may affect maximum RPM values.

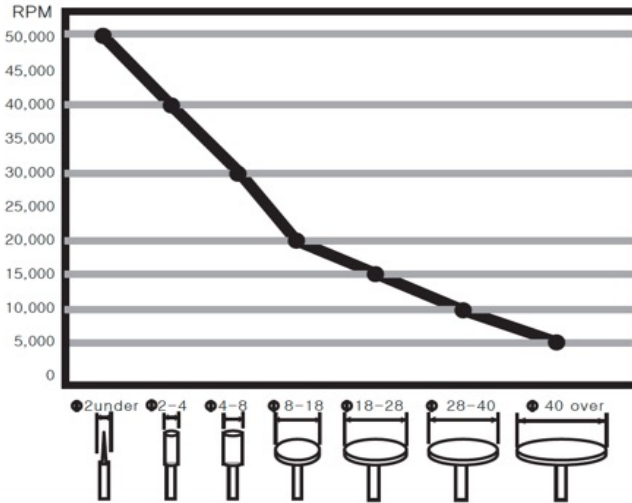


Fig. 2—Fig. Recommended maximum RPM/bur diameter.

Power



CAUTION: Do not turn on the power while the collet chuck of the handpiece is open. The motor could short circuit.



CAUTION: To avoid an injury caused by a sudden start, verify that the switch is off before putting the power plug in the wall socket (mains).

NOTE: A circuit breaker is provided to protect the motor. It is activated when there is an overload the motor will not tolerate.

NOTE: Unplug the power cord before disconnecting the control box.

NOTE: Set the correct voltage on the control box and use an appropriate fuse.

Parts List

After unpacking, verify that there is no visible damage to the sensor. Verify that all items are included:

- (1) WPI P40 Drill
- (1) Control Box
- (1) Foot Pedal
- (1) WPI P40 Drill Plastic Holder
- (1) Collet Chuck Wrench
- (1) Replacement Carbon Brushes (set of 2)
- (1) Accessories Pack which includes:
 - (1) Abrading Tip (stone)
 - (1) Rubber Abrading Tip
 - (1) Accessory Stand
 - (1) BallMill, Carbide, #1, 0.031 diameter
 - (1) BallMill, Carbide, #2, 0.039 diameter
 - (1) BallMill, Carbide, #3, 0.047 diameter
 - (1) BallMill, Carbide, #4, 0.055 diameter
 - (1) BallMill, Carbide, #5, 0.063 diameter
 - (1) BallMill, Carbide, #6, 0.071 diameter
 - (1) BallMill, Carbide, #7, 0.083 diameter
 - (1) BallMill, Carbide, #1/4, 0.019 diameter
 - (1) BallMill, Carbide, #1/2, 0.027 diameter
 - (4) Cutoff Disks
 - (1) Mandrel (screw)
 - (1) Mandrel (threaded)
- (1) Instruction Manual

Unpacking

Upon receipt of this instrument, make a thorough inspection of the contents and check for possible damage. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed damage should be reported at once to the carrier and an inspection requested. Please read the section entitled "Claims and Returns" on page 15 of this manual. Please contact WPI Customer Service if any parts are missing at 941.371.1003 or customerservice@wpiinc.com.

Returns: Do not return any goods to WPI without obtaining prior approval (RMA # required) and instructions from WPI's Returns Department. Goods returned (unauthorized) by collect freight may be refused. If a return shipment is necessary, use the original container, if possible. If the original container is not available, use a suitable substitute that is rigid and of adequate size. Wrap the instrument in paper or plastic surrounded with at least 100mm (four inches) of shock absorbing material. For further details, please read the section entitled "Claims and Returns" on page 15 of this manual.

INSTRUMENT DESCRIPTION



Fig. 3—The WPI P40 Drill components are labeled.

Speed Control Dial – Variable speed control dial lets you choose from 0-40,000 RPM.

Power Lamp – The LED illuminates when the power is on.

Motor Connector – This is the connection port for the handpiece.

Power Switch – Switch to turn the power on (1). If using the foot pedal, set the power switch to off (0).

Voltage Selection Switch – Selects 110 or 220V for the operation of the WPI P40 Drill

Forward Reverse Switch – Set the direction the motor (bur) spins.

Foot Switch Connector – This is the connection port for the foot switch (manual on/off switch).

Power Cord – Plug cord into a standard wall outlet (mains).



Fig. 4—Microdrill features are labeled.

Carbon Brushes Compartment – Unscrew the compartment cover to access the carbon brushes. Carbon brushes should be changed routinely, at least once a year or every 1,000 hours of use. See “Changing the Carbon Brushes” on page 8.

Collet Chuck Lock – This lock has two positions. With the bur pointed away from you, rotate the chuck lock counterclockwise to the R position to release the bur. The bur can then be removed or replaced. Rotate the lock clockwise to the S position to secure a bur in place.

Spindle Assembly – This housing covers the spindle shaft. The spindle shaft includes the motor shaft and collet chuck assembly.

Collet Chuck Cover – Use the collet chuck wrench to remove the cover. The collet chuck is located under this cover.

Bur – The WPI P40 Drill comes with a blank shaft and a tool set, but any standard 3/32" (or 2.35 mm) bit or bur will fit in the WPI P40 Drill collet chuck.

Setup

Installing the Drill on Stereotaxic Holder

You can install the drill on a stereotaxic frame using the **505247** Drill holder.

1. Use the Allen key provided with the drill holder to loosen the screw on the mounting bracket.
2. Wedge a flat head screwdriver into the gap in the mouth of the mounting bracket and pry the bracket open enough to allow the drill to slide into position.
3. Slide the drill into the mounting bracket so that the bracket holds the drill in the center section of the body.
4. Reinstall the screw in the mounting bracket and use the Allen key to tighten in.

Setting up the Drill

1. Verify that the control box power switch is off (0).
2. Plug the power cord into the wall outlet (mains).
3. Verify that the voltage setting is what you require. Use the Voltage Selection Switch on the side of the controller to select 110 or 220V for the operation.
4. Connect handpiece to the motor connector port of the front of the control box.
5. Set the speed dial on the control box to the zero position (fully counterclockwise).
6. Verify that the chuck lock of the handpiece is locked. If the bur does not pull out easily, the chuck lock is in the secure position. If not, secure it. To secure the chuck lock, point the bur away from you and rotate the chuck lock clockwise to the S position.
7. Hold the handpiece with one hand, and with the other hand turn on the power to the control box.
8. Verify that the handpiece is running normally using the speed control dial on the front of the control box.
9. Turn off the power and connect the foot pedal to the foot pedal connector on the back of the control box.
10. Check the operating speed of the foot switch. With the power switch in the off (0) position, press the foot switch and slowly increase the speed using the speed control dial.
11. Turn off the power and switch to the reverse direction using the Forward/Reverse switch on the front of the control box.

OPERATING INSTRUCTIONS

Changing the Bur

1. To release the chuck lock, point the bur away from you and rotate the chuck lock counter clockwise to the R position. When you hear a click, the collet chuck is open.
2. When the chuck is opened, remove the bur.
3. Insert the desired bur.
4. To secure the chuck lock, point the bur away from you and rotate the chuck lock clockwise to the S position. When you hear a click, the collet chuck is closed and the bur is secured.

Normal Operations

1. Install the desired bur in the handpiece collet chuck, and verify that the chuck lock is in the secure position. See Changing the Bur, above. Do not turn the WPI P40 Drill on until the bur is secured.
2. If desired, the WPI P40 Drill can be mounted in WPI's stereotaxic frame (Fig. 5) using the WPI P40 Drill Mounting Probe for Stereotaxic Frames (WPI #**505247**).



Fig. 5—WPI P40 Drill mounted in a 505247 which can be mounted on a stereotaxic frame.

3. If you are using the foot switch, set the power switch to off (0). Otherwise, turn the power switch to on (1). When the power is on, the power light illuminates.
4. Adjust the speed control dial on the front of the control box to the desired speed.
5. Use the WPI P40 Drill to polish, cut or drill.

MAINTENANCE

- Keep the area around in handpiece free of dust and grindings.
- Remove dust from the exterior of the handpiece by wiping it with a cloth moistened with isopropyl alcohol. Avoid getting moisture on the inside of the WPI P40 Drill.
- Do not apply oil to the WPI P40 Drill or clean it with water. Oil could break down the grease inside the bearings.
- Air cleaning is acceptable, but air pressure may affect the handpiece or motor.



CAUTION: Do not allow water-based fluids to enter the collet/chuck area behind the bur shaft, as this will void the warranty. Water infusion can cause the internal bearings to rust, requiring a replacement of the hand piece. We recommend covering the collet with a surgical glove during use. Pierce a finger on the glove for the bur.

Changing the Carbon Brushes

A replacement set of carbon brushes has been provided with your WPI P40 Drill. To prevent damage to the motor, periodically check the carbon brushes for wear. The motor can be damaged if worn carbon brushes are not replaced in time. Carbon brushes wear like a pencil eraser and should be replaced after about 1,000 hours of use. These brushes should be replaced before the wear reaches the tiny hole on one side where the copper spring is attached to the carbon brush. See Fig. 6 on page 9.



CAUTION: Verify that the power is off and the control box is unplugged before changing the carbon brushes.

1. Turn off the power on the control box and unplug the power cable.
2. Unscrew the carbon brushes compartment cover at the base of the handset to expose the carbon brushes. See Fig. 7. There is a carbon brush on either side of the WPI P40 Drill, and they should be changed at the same time.

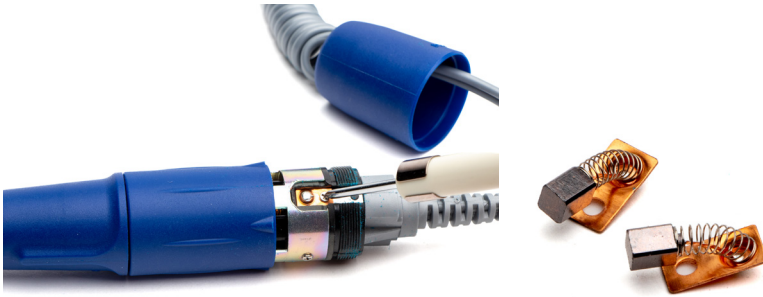


Fig. 6—(Right) Use a screwdriver to remove carbon brushes.

Fig. 7—(Left) Carbon brushes

3. Use a small Phillips head screwdriver to remove the two screws holding the carbon brushes.
4. Use a pair of tweezers and gently remove the used carbon brushes. Pull them straight up.
5. Put the screws in the holes of the new carbon brushes (supplied with your WPI P40 Drill) and insert the new brushes the same way the old ones came out. Line up the screws with the screw holes and gently compress the spring as you position the new carbon brushes. Hold it in place while you tighten the screw.
6. Reposition the carbon brushes compartment cover and screw it into place.
7. **IMPORTANT:** Run the motor for one minute with no load in order to break in the brushes correctly.

ACCESSORIES

Part Number	Description
504458-5	Replacement Fuse 120V-T3.15A/250V (pkg. of 5)
503560-5	Replacement Fuse 230V-T2A/250V (pkg. of 5)
501842	Ball Mill, Carbide, #7, 0.083" diameter (pkg. of 5)
501850	Abrading Tip, Rubber (pkg. of 20)
501851	Abrading Tip, Stone (pkg. of 5)
501852	Accessory stand
501853	Ball Mill, Carbide, #1, 0.031" diameter (pkg. of 5)
501854	Ball Mill, Carbide, #2, 0.039" diameter (pkg. of 5)
501855	Ball Mill, Carbide, #3, 0.047" diameter (pkg. of 5)
501856	Ball Mill, Carbide, #4, 0.055" diameter (pkg. of 5)
501857	Ball Mill, Carbide, #5, 0.063" diameter (pkg. of 5)
501858	Ball Mill, Carbide, #6, 0.071" diameter (pkg. of 5)
501860	Ball Mill, Carbide, #1/4, 0.019" diameter (pkg. of 5)
501861	Ball Mill, Carbide, #1/2, 0.027" diameter (pkg. of 5)
501862	Cutoff Disk (pkg. of 20)
501863	Mandrel, Screw (pkg. of 5)
501964	Mandrel, Threaded (pkg. of 5)
505247	Drill Holder

TROUBLESHOOTING

Control Box

Issue	Possible Cause	Solution
The motor does not run.	The power lamp is out, when the power switch is turned on.	Check the fuse.
		Verify that the power cord is securely connected.
	The power lamp is illuminated, but the handpiece does not run, when the hand/foot switch is on.	Verify that the handpiece is securely connected to the control box.
		Verify that the foot pedal connector is securely connected.
		Turn off the power, and check the carbon brushes. If necessary, change the carbon brushes. See "Changing the Carbon Brushes" on page 9.

Handpiece

Issue	Possible Cause	Solution
The handpiece does not run, although the chuck is locked.	Mechanical failure of the spindle assembly.	Turn off the power, and remove the collet chuck cover and verify that the spindle shaft rotates easily.
	Carbon brushes are worn out.	See "Changing the Carbon Brushes" on page 9.
	Control box connection is bad.	Verify that the handpiece is securely connected to the control box.
Noise and vibration during use.	Check for a bent bur.	Change the bur. See "Changing the Bur" on page 7.

NOTE: If salt or water gains access inside the handpiece, it may corrode and jam. At that point, the handpiece must be disassembled to rectify the problem. Please contact Technical Support for specific instructions on this procedure.

NOTE: If you have a problem/issue with that falls outside the definitions of this troubleshooting section, contact the WPI Technical Support team at 941.371.1003 or technicalsupport@wpiinc.com.

SPECIFICATIONS

This unit conforms to the following specifications:

General

Maximum Speed	40,000 rpm
Maximum Torque	3.0 N·cm
Overload Protection Function	Yes

Environment Setup

Temperature	10°C~30°C
Humidity	10~80%
Air pressure	700~1060 hPa

Bur

Dimensions of the bur	2.35 mm (ISO7785-2 TYPE2)
Minimum fitting length of bur	10 mm

Power

Power Input	110 V/220 V, 50/60 Hz
Maximum Current	2 A
Control box fuse	250 V/2 A (T2AL250V)

DECLARATION OF CONFORMITY



WORLD PRECISION INSTRUMENTS, LLC.
Telephone: (941) 371-1003 Fax: (941) 377-5428
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DECLARATION OF CONFORMITY CE

We: World Precision Instruments, Inc.
175 Sarasota Center Boulevard
Sarasota, FL 34240-9258, USA

as the manufacturer/distributor of the apparatus listed, declare under sole responsibility that the product(s):

505635 (WPI P40 DRILL)

To which this declaration relates is/are in conformity with the following standards or other normative documents:

Low Voltage Directive (Safety) 2014/35/EU:

- IEC 60335-2-8:2012, AMD1:2015

EMC Directive 2014/30/EU:

- EN 55014-1:2017+A11:2020
- EN IEC 55014-2:2021 (Cat II)
- EN IEC 61000-3-2:2019
- EN 61000-3-3:2013/A1:2019


Cory Boyes / Director of Design and
Development

Issued On: June 30, 2022

Europe Representative
Mr Andrew Waldes
Managing Director
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F-QC-006 Rev D

WARRANTY

WPI (World Precision Instruments) warrants to the original purchaser that this equipment, including its components and parts, shall be free from defects in material and workmanship for a period of one year* from the date of receipt. WPI's obligation under this warranty shall be limited to repair or replacement, at WPI's option, of the equipment or defective components or parts upon receipt thereof f.o.b. WPI, Sarasota, Florida U.S.A. Return of a repaired instrument shall be f.o.b. Sarasota.

The above warranty is contingent upon normal usage and does not cover products which have been modified without WPI's approval or which have been subjected to unusual physical or electrical stress or on which the original identification marks have been removed or altered. The above warranty will not apply if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electric power, air conditioning, humidity control, or causes other than normal and ordinary usage.

To the extent that any of its equipment is furnished by a manufacturer other than WPI, the foregoing warranty shall be applicable only to the extent of the warranty furnished by such other manufacturer. This warranty will not apply to appearance terms, such as knobs, handles, dials or the like.

WPI makes no warranty of any kind, express or implied or statutory, including without limitation any warranties of merchantability and/or fitness for a particular purpose. WPI shall not be liable for any damages, whether direct, indirect, special or consequential arising from a failure of this product to operate in the manner desired by the user. WPI shall not be liable for any damage to data or property that may be caused directly or indirectly by use of this product.

Claims and Returns

Inspect all shipments upon receipt. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed loss or damage should be reported at once to the carrier and an inspection requested. All claims for shortage or damage must be made within ten (10) days after receipt of shipment. Claims for lost shipments must be made within thirty (30) days of receipt of invoice or other notification of shipment. Please save damaged or pilfered cartons until claim is settled. In some instances, photographic documentation may be required. Some items are time-sensitive; WPI assumes no extended warranty or any liability for use beyond the date specified on the container

Do not return any goods to us without obtaining prior approval and instructions from our Returns Department. Goods returned (unauthorized) by collect freight may be refused. Goods accepted for restocking will be exchanged or credited to your WPI account. Goods returned which were ordered by customers in error are subject to a 25% restocking charge. Equipment which was built as a special order cannot be returned.

Repairs

Contact our Customer Service Department for assistance in the repair of apparatus. Do not return goods until instructions have been received. Returned items must be securely packed to prevent further damage in transit. The Customer is responsible for paying shipping expenses, including adequate insurance on all items returned for repairs. Identification of the item(s) by model number, name, as well as complete description of the difficulties experienced should be written on the repair purchase order and on a tag attached to the item.

** Electrodes, batteries and other consumable parts are warranted for 30 days only from the date on which the customer receives these items.*

USA

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